## WO 00/50639

## Continued

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	maltase-glucoamylase/alpha- glucosidase/MGAM	154360	NM_00466 8	Chr.7
	lactase-phlorizin hydrolase/LPH/lactase/LCT	603202	NM_00229 9	2q21
Glycosidases		104700	NM_00403 8	1p21
	salivary amylase B/AMY1B	104701	***	1p21
	salivary amylase C/AMY1C	104702	****	1p22
	pancreatic amylase A/AMY2A	104650	X07057	1p21
	pancreatic amylase B/AMY2B	104660	****	1p21
	dipeptidylpeptidase IV/CD26/ADA complexing protein 2/DPP4	102720	NM_00193 5	2q23
	pepsinogen A/PGA/PG	169700	AH001519	11q13
	pepsinogen, group 3/PGA3	169710	****	11913
	pepsinogen C/PGC	169740	J04443	6p21.3- p21.1
	kallikrein 1/KLK1	147910	AH002853	19q13.2- q13.4
	chymotrypsin-like protease	118888	X71875	16q22.1
	trypsinogen 1/TRY1/protease, serine 1/PRSS1	276000	00276 9	7q35
	trypsinogen 1/TRY2/protease, serine 2/PRSS2	601564	NM_00277 0	7q35
	trypsinogen 1/TRY3/protease, serine	***	NM_00277 1	* * *
Destance	enterokinase 1/TRY3/protease, serine7/PRSS7	226200	NM_00277	21q21

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	and Peptidases	chymotrypsinogen 1/CTRB1	11889	118890 NM_00190 6	16q23.2- q23.3
Gastrointesti nal Drug	•	carboxypeptidase A1/CPA1	114850	0 NM_00186	7q32-qter
Metabolism		carboxypeptidase A2/CPA2	889009	8 NM_00186	* * * *
		carboxypeptidase Z/CPZ	603105	5 NM_00365 2	
		elastase 1/ELA1	130120	D00158	12q13
		renal microsomal dipeptidase/DPEP1 (b-lactam ring hydrolysis)		) NM_00441	16q24.3
		tripeptidyl peptidase II/TPP2	190470	190470 NM_00329	13q32-q33
		protease inhibitor 1/alpha-1- antitrypsin/AAT/PI	107400	107400 NM_00029 5	14q32.1
		protease inhibitor/alpha-1-antichymotrypsin/AACT	107280	107280 NM_00108 5	14q32.1
		protease inhibitor I (alpha-1- antitrypsin)-like/PIL	107410	NM_00622 0	14q32.1
		Carboxyl ester lipase (bile saltstimulated lipase)/CEL	114840	M85201	9q34.3
· · · · · · · · · · · · · · · · · · ·		Carboxyl ester lipase-like (bile saltstimulated lipase-like)/CELL	ilt- 114841	NM_00180 8	9q34.3
	Lipases	Pancreatic colipase/CLPS	120105	M95529	6pter-p21.1
		Pancreatic triglyceride lipase/PNLIP	LIP 246600	AH003527	10q26.1
	-	Lipoprotein lipase/LPL	238600	NM_00023	l
		Hepatic triglyceride lipase/LIPC	151670	151670 AH005429	

		salivary peroxidase/SAPX	170990	U39573	****
	Oxidases	alcohol dehydrogenases 6/ADH6	103735	NM_00067	15926
	Esterases	paraoxonase 2/PON2	602447	L48513	7q21.3
	Phoenhatase	intestinal alkaline phosphatase/ALPI	171740	NM_00163	
	S	tissue non-specific alkaline phosphatase/liver alkaline phosphatase/ALPL	171760	171760 NM_00047	1p
		serum albumin/ALB	103600	NM_00047	4q11-q13
		alpha fetoprotein/AFP	104150	104150 NM_00113	4q11-q13
	and the same of th	alpha albumin/afamin/AFM/ALB2	104145	NM_00113	4q11-q13
		vitamin D-binding protein/group- specific component/GC	139200	AH004448	4q12
	Rlood	orosomucoid 1/alpha 1 acid glycoprotein/ORM1	138600	M13692	9q34.1- q34.3
	Transport	orosomucoid 2/alpha 1 acid glycoprotein, type 2/ORM2	138610	NM_00060 8	9q34.1- q34.3
		transthyretin (prealbumin, amyloidosis type I)/TTR	176300	NM_00037	18q11.2- q12.1
		thyroxin-binding globulin/TBG	314200	NM_00035 4	Xq22.2
Drug Binding		corticosteroid binding globulin precursor/CBG	122500	NM_00175 6	14q32.1
		sex hormone-binding globulin/SHBG	182205	X16349	17p13-p12

	mannose-binding lectin,	154545	154545 NM_00024	10q11.2-
	Hepatic fatty acid binding protein/FABP1	134650	***	2p11
	Intestinal fatty acid binding protein/FABP2	134640	NM_00013 4	4q28-q31
Bile Acid	Muscle fatty acid binding protein/mammary-derived growth inhibitor/MDGI/FABP3	134651	NM_00410	1p33-p31
Binders	Adipocyte fatty acid binding protein/FABP4	600434	NM_00144 2	8q21
	Ileal fatty acid binding protein/FABP6 600422	600422	U19869	5q23-q35
	Diain latty actu omunig	602965	D88648	6q22-q23
	Adipocyte long chain fatty acid transport protein/FATP	600691	***	**
	Retina-specific ATP binding cassette transporter/ABCR	601691	NM_00035	1p21-p13
	ATP binding cassette 1/ABC1	600046	AJ012376	9q22-q31
	ATP binding cassette 2/ABC2	600047	U18235	9q34
	ATP binding cassette 3/ABC3	601615	NM_00108 9	16p13.3
	ATP binding cassette 7/ABC7	300135	AB005289	Xq13.1- q13.3
	ATP binding cassette 8/ABC8	603076	AF038175	21q22.3
	ATP-binding cassette 50/ABC50	603429	AF027302	6p21.33
	Placenta-specific ATP-binding cassette transporter/ABCP	603756	603756 NM_00482	4q22

7q31.2	303 Xq28	0 12q11-q12	11p15.1	1p22-p21	14924.3	6p21.3	)54 6p21.3	8 16p13.1	10q24	378	*****	*****	******
NM_00049   2	NM_00003	U28150	NM_00035	NM_00285 8	0 NM_00505	NM_00059	NM_00054	T05628	NM_00039	NM_00378 6			NM_00569
602421	300100	601081	602009	170995	603214	170260	170261	158343	601107	* * * *	* * * *	* * * *	601439
cystic fibrosis transmembrane conductance regulator/CFTR	adrenoleukodystrophy/adrenomyelone uropathy/ALD	adrenoleukodystrophy related protein/ALDR	sulfonylurea receptor (hyperinsulinemia)/SUR	peroxisomal membrane protein 1/PXMP1	peroxisomal membrane protein 1-like/PXMP1L	BC antigen peptide transporter 1/MHC porters 1/TAP1	antigen peptide transporter 2/MHC 2/TAP2	multidrug resistance associated protein MRP1	multidrug resistance associated protein MRP2/CMOAT	ATP-binding cassette, sub-family C (CFTR/MRP), member 3/CMOAT2	ATP-binding cassette, sub-family C (CFTR/MRP), member 4/MOATB	ATP-binding cassette, sub-family C (CFTR/MRP), member 5/SMRP	ATP-binding cassette, sub-family C

Absorption and Distribution

multidrug resistance protein MDR1	171050	X96395	7q21.1
multidrug resistance protein MDR3/P-glycoprotein 3/PGY3	602347	X06181	7q21.1
anthracylcline resistance-related protein/ARA	603234	NM_00117 1	16p13.1
bile salt export pump/BSEP	603201	NM_00374 2	2q24
familial intrahepatic cholestasis	602397	NM_00560 3	18q21
Human sorcin/SRI	182520	L12387	7q21.1
Solute carrier family 1, member 1/SLC1A1 (glutamate)	133550	68680N	9p24
Solute carrier family 1, member 2/SLC1A2 (glutamate)	600300	U03505	11p13-p12
Solute carrier family 1, member 3/SLC1A3 (glutamate)	600111	U03504	5p13
Solute carrier family 1, member 4/SLC1A4 (glutamate)	600229	NM_00303 8	2p15-p13
Solute carrier family 1, member 5/SLC1A5 (neutral AA)	109190	AF105230	19q13.3
Solute carrier family 1, member 6/SLC1A6 (glutamate)	600637	NM_00507 1	***
Solute carrier family 2, member 1/SLC2A1/SGLT1 (glucose)	182380	NM_00651 6	22q13.1
Solute carrier family 2, member 2/SLC2A2/GLUT2 (glucose)	138160	NM_00651 6	3q26.1- q26.3
Solute carrier family 2, member 3/SLC2A3/GLUT3 (glucose)	138170	M20681	12p13.3

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Drug Uptake

Solute carrier family 2, member 4/SLC2A4/GLUT4 (glucose)	138190	**	17p13
Solute carrier family 2, member 5/SLC2A5/GLUT5 (glucose)	138230	NM_00303	1p36.2
Solute carrier family 3 member 1/SLC3A1 (aa transporter)	104614	**	2p16.3
Solute carrier family 5 member 1/SLC5A2 (glucose)	182381	***	16p11.2
Solute carrier family 5 member 3/SLC5A3 (myoinositol)	600444	L38500	21922
Solute carrier family 5 member 6/SLC5A6 (folate, biotin, lipoate)	604024	**	2p23
Solute carrier family 6 member 1/SLC6A1 (GABA)	137165	X54673	3p25-p24
Solute carrier family 6 member 2/SLC6A2 (noradrenalin)	163970	NM_00104	16q12.2
Solute carrier family 6 member 3/SLC6A3 (dopamine)	126455	L24178	5p15.3
Solute carrier family 6 member 4/SLC6A4 (serotonin)	182138	X70697	17q11.1- q12
Solute carrier family 6, member 5/SLC6A5 (glycine)	604159	NM_00421 1	***
Solute carrier family 6, member 6/SLC6A6 (taurine)	186854	U16120	3p25-q24
Solute carrier family 6, member 8/SLC6A8 (creatine)	300036	NM_00562 9	300036
Solute carrier family 6, member 9/SLC6A9 (glycine)	601019	S70612	1p33

	Solute carrier family 6, member 10/SLC6A10 (creatine-testis)	601294	*	16p11.2
	Solute carrier family 6, member 12/SLC6A12 (GABA-betaine)	603080	NM_00304 4	12p13
	Solute carrier family 7, member 1/SLC7A1 (cationic AA)	104615	* * * *	13q12.3
	Solute carrier family 7, member 2/SLC7A2 (cationic AA)	601872	D29990	8p22
	Solute carrier family 7, member 4/SLC7A4 (cationic AA)	603752	*	22q11.2
	Solute carrier family 7, member 5/SLC7A5 (neutral AA)	600182	M80244	16q24.3
	Solute carrier family 7, member 7/SLC7A7 (dibasic AA)	603593	Y18474	14q11.2
	Solute carrier family 7, member 9/SLC7A9 (neutral AA)	604144	****	19q13.1
	Solute carrier family 10, member 1/SLC10A1 (taurocholate)	182396	NM_00304 9	chr. 14
	Solute carrier family 10, member 2/SLC10A2 (taurocholate)	601295	NM_00045 2	13q33
	Solute carrier family 11, member 1/SLC11A1 (?)	600266	AH002806	2q35
ute	Solute carrier family 11, member 2/SLC11A2 (iron)	600523	L37347	12q13
orters	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1- q11.1
	Solute carrier family 14, member 1/SLC14A1 (urea)	111000	****	18q11-q12

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18q12.1- q21.1	13q33-q34	**	1p13.2-p12	Xq13.2	** ** **	***	**	* * * * *	12q13	10q25	8p21.3	10q11.2	21q22.3	
69696X	U13173	S78203	NM_00305 1	NM_00651	NM_00420 7	***	NM_00469 5	NM_00469 4	AF049608	L09118	***	NM_00305 5	U19720	
601611	600544	602339	600682	300095	603877	603878	603879	603880	603654	193001	193002	600336	600424	
Solute carrier family 14, member 2/SLC14A2 (urea)	Solute carrier family 15, member 1/SLC15A1 (peptides)	Solute carrier family 15, member 2/SLC15A2 (peptides)	Solute carrier family 16, member 1/SLC16A1 (monocarboxylic acids)	Solute carrier family 16, member 2/SLC16A2 (monocarboxylic acids)	Solute carrier family 16, member 3/SLC16A3 (monocarboxylic acids)	Solute carrier family 16, member 4/SLC16A4 (monocarboxylic acids)	Solute carrier family 16, member 5/SLC16A5 (monocarboxylic acids)	Solute carrier family 16, member 6/SLC16A6 (monocarboxylic acids)	Solute carrier family 16, member 7/SLC16A7 (monocarboxylic acids)	Solute carrier family 18, member 1/VAT1/SLC18A1 (monoamines)	Solute carrier family 18, member 2/VAT2/SLC18A2 (monoamines)	Solute carrier family 18, member 3/VAT3/SLC18A3 (monoannines)	Solute carrier family 19, member 1/SLC19A1 (reduced folate)	4czf01xls

Solute carrier family 19, member 2/SLC19A2 (thiamine)	603941	AF160186	1q23.2- q23.3
Solute carrier family 21, member 2/SLC21A2 (prostaglandin)	601460	NM_00563 0	3q21
Solute carrier family 21, member 3/SLC21A3 (organic anion)	602883	NM_00507 5	12p12
Solute carrier family 22, member 1/SLC22A1 (organic cation)	602607	NM_00305 8	6926
Solute carrier family 22, member 1-like/SLC22A1L (organic cation)	602631	AF037064	11p15.5
Solute carrier family 22, member 2/SLC22A2 (organic cation)	602608	NM_00305 8	6926
Solute carrier family 22, member 4/SLC22A4 (organic cation)	604190	NM_00305 9	Chr. 5
Solute carrier family 22, member 5/SLC22A5 (carnitine)	603377	603377 NIM_00306	5q33.1
Solute carrier family 25, member 1/SLC25A1 (tricarboxylic acids) (mitochondrial)	190315	X96924	22q11
Solute carrier family 25, member 11/SLC25A11 (oxoglutarate/malate) (mitochondrial)	604165	604165 NM_00356	17p13.3
Solute carrier family 25, member 12/SLC25A12 (?) (mitochondrial)	603667	NM_00370 5	**
Solute carrier family 25, member 13/SLC25A13 (?) (mitochondrial)	603859	* * * *	7q21.3

Solute carrier family 25 member	<u> </u>		
15/SLC25A15 (omithine) (mitochondrial)	603861	**	13q14
Solute carrier family 25, member 16/SLC25A16 (ADP/ATP) (mitochondrial)	139080	M31659	10q21.3- q22.1
Solute carrier family 29, member 1/SLC29A1/ENT1 (nucleoside) (mitochondrial)	602193	NM_00495	6p21.2- p21.1
Solute carrier family 29, member 2/SLC29A2/ENT2 (nucleoside) (mitochondrial)	602110	X86681	11q13
Aryl hydrocarbon receptor nuclear translocator/ARNT	126110	NM_00166 8	1921
Aryl hydrocarbon receptor nuclear translocator-like/ARNTL	602550	NM_00117 8	11p15
Aryl hydrocarbon receptor/AHR	600253	NM_00162 1	7p15
Nuclear receptor subfamily 1, group I, member 2/NR112	603065	NM_00388 9	* * * *
Constitutive androstane receptor, beta/orphan nuclear hormone receptor/CAR	603881	NM_00512	**
Nuclear receptor subfamily 1, group H, member 2/NR1H2	086009	U07132	19q13.3
Retinoic acid receptor, alpha/RARA	180240	NM_00096 4	17q12
Retinoic acid receptor, beta/RARB	180220	180220 NM_00096	3p24

Retinoic acid receptor, gamma/RARG	180190	M57707	12q13
Retinoid X receptor alpha/RXRA	180245	NM_00569	9q34.3
Retinoid X receptor beta/RXRB	180246	X66424	6p21.3
Retinoid X receptor gamma/RXRG	180247	U38480	1q22-q23
RAR-related orphan receptor A/RORA	600825	NM_00294	15q21-q22
RAR-related orphan receptor B/RORB	600825	****	15q21-q22
RAR-related orphan receptor C/RORC 602943	602943	NM_00506 0	1421
cellular retinoic acid-binding protein, type 2/CRABP2	180231	****	1q21.3
glucocorticoid receptor/GRL	138040	NM_00017 6	5q31
Peroxisome proliferative activated receptor, alpha/PPARA	170998	NM_00503 6	22q12- q13.1
Peroxisome proliferative activated receptor, gamma/PPARG	601487	NM_00503 7	3p25
Peroxisome proliferative activated receptor, delta/PPARD	6E+05	NM_00623 8	1q21.3
cytochrome P450, subfamily I, polypeptide 1 (aryl hydrocarbon oxidase)/CYP1A1	108330	NM_00049	15q22-q24
cytochrome P450, subfamily I, polypeptide 2 (phenacetin metabolism)/CYP1A2	124060	AH002667	15q22-qter
cytochrome P450, subfamily IB, polypeptide 1 (dioxin inducible)/CYP1B1	601771	601771 NM_00010	2p22-p21

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19q13.2	19q13.2	19q13.2	10q24	10q24	10q25	10q24.1- q24.3	22q13.1	10q24.3- qter	19q13.2	1p31.3- p31.2	
X13897	NM_00076	M29874	***	**	* * * *	00076 9	NM_00010 6	J02843	NM_00077	NM_00077	
123960	122720	123930	601129	601130	601131	124020	124030	124040	124070	601258	
cytochrome P450, subfamily II, polypeptide 1 (phenobarbital inducible)/CYP2A	cytochrome P450, subfamily IIA, polypeptide 6 (coumarin-7-hydroxylase)/CYP2A6	cytochrome P450, subfamily IIB (phenobarbital inducible)/CYP2B	cytochrome P450, subfamily IIC, polypeptide 8/CYP2C8	cytochrome P450, subfamily IIC, polypeptide 9 (hydroxylation of tolbutamide)/CYP2C9	cytochrome P450, subfamily IIC, polypeptide 18/CYP2C18	cytochrome P450, subfamily IIC, polypeptide 19 (mephenytoin 4-hydroxylase)/CYP2C19	cytochrome P450, subfamily IID, polypeptide 6 (debrisoquine hydroxylation)/CYP2D6	cytochrome P450, subfamily IIE (ethanol inducible)/CYP2E	cytochrome P450, subfamily IIF (ethoxycoumarin monooxygenase), polypeptide 1/CYP2F1	cytochrome P450, subfamily IIJ (arachidonate epoxygenase), polypeptide 2/CYP2J2	4czf01xls
					DARO	Cytochromes and	Factors				
·					·	Cytochrome P450s					

cytochrome P450, subfamily IIIA (niphedipine oxidase), polypeptide 3/CYP3A4	124010	NM_00077 6	7q22.1
cytochrome P450, subfamily IVA (fatty acid W-hydroxylase), polypeptide 11/CYP4A11	601310	NM_00077	Chr.1
cytochrome P450, subfamily IVB, polypeptide 1/CYP4B1	124075	6 6 6	1p34-p12
cytochrome P450, subfamily IVF (leukotriene B4-W-hydroxylase), polypeptide 3/CYP4F3	601270	NM_00089 6	19p13.2
cytochrome P450, subfamily VIIA (cholesterol 7-a-hydroxylase), polypeptide 1/CYP7A1	118455	M89803	8q11-q12
cytochrome P450, subfamily VIIB (oxysterol 7-a-hydroxylase), polypeptide 1/CYP7B1	603711	AF029403	8q21.3
cytochrome P450, subfamily VIIIB (sterol 12-a-hydroxylase), polypeptide 1/CYP8B1	602172	* * * * *	3p21.3-p22
cytochrome P450, subfamily XIA (cholesterol side-chain cleavage)/CYP11A	118485	NM_00078	15q23-q24
cytochrome P450, subfamily XIB, polypeptide 2 (steroid 11-b-hydroxylase)/CYP11B2	124080	124080 NM_00049	8q21
cytochrome P450, subfamily XIX (androgen aromatase)/CYP19	107910	107910 NM_00010	15q21.1
cytochrome P450, subfamily XXI (sterol 21-a-hydroxylase)/CYP21	201910	M13936	6p21.3

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		cytochrome P450, subfamily XXIV (25-hydroxyvitamin D 24-hydroxylase)/CYP24	600125	S67623	20q13.2- q13.3
		cytochrome P450, subfamily XXVIA, polypeptide 1 (retinoic acid hydroxylase)/CYP26A1	602239	NM_00078	10q23-q24
		cytochrome P450, subfamily XXVIIA, polypeptide 1 (25-hydroxyvitamin D-1-213700 a-hydroxylase)/CYP27A1	213700	NM_00010 5	2q33-qter
		adrenodoxin/ferredoxin 1/FDX1/ADX 103260	103260	NM_00410 9	11922
	·	adrenodoxin reductase/ferredoxin:NADP(+) reductase/FDXR/ADXR	103270	103270 NM_00411	17q24-q25
		cytochrome P450, subfamily XXVIIB, polypeptide 1 (25-hydroxyvitamin D-1 264700 a-hydroxylase)/CYP27B1	264700	NM_00078 5	12q14
		cytochrome P450, subfamily XLVI (cholesterol 24-hydroxylase)/CYP46	604087	NM_00666	14q32.1
		cytochrome P450, subfamily Ll (lanosterol 14-a-demethylase)/CYP51	601637	U51692	7q21.2- q21.3
	Cofactor	1 MOREL MANAGEMENT STREET	603707	AJ224328	6p21.3
	Synthesis		603708	****	5q11
·		alcohol dehydrogenases 1, alpha subunit/ADH1	103700	NM_00066	4922
Phase I Drug Metabolism		alcohol dehydrogenases 2, beta subunit/ADH2	103720	99000 MN 8	4q22
(oxidation and	Alcohol	alcohol dehydrogenases 3, gamma subunit/ADH3	103730	M12272	4q22

	Dehydrogen	Dehydrogen alcohol dehydrogenases 4/ni			
	ases	isozyme/ADH4	103740	M15943	4q22
		alcohol dehydrogenases 5/chi isozyme/ADH5	103710	NM_00067	4q21-q25
		alcohol dehydrogenases 6/ADH6	103735	NM_00067	15q26
		alcohol dehydrogenases 7/ADH7	600086	AH006682	4q23-q24
		aldehyde dehydrogenase 1/ALDH1 (liver cytosol)	100640	AH002598	9421
		aldehyde dehydrogenase 2/ALDH2 (liver mitochondria)	100650	K03001	12q24.2
		3/acetaldehyde	100660	M74542	17p11.2
		5/acetaldehyde	100670	NM_00069	9p13
~ ~	Aldehyde	aldehyde dehydrogenase 5, member A1/succinic semialdehyde dehydrogenase/ALDH5A1	271980	271980 NM_00108 0	6p22
1		6/acetaldehyde	600463	NM_00069 3	15q26
		7/acetaldehyde	600466	NM_00069 4	11q13
		aldehyde dehydrogenase 8/ALDH8	601917	NM_00069 5	chr. 11
		aldehyde dehydrogenase 9/g- aminobutyraldehyde dehydrogenase/ALDH9	602733	09000 MN	1q22-q23
ı		aldehyde dehydrogenase 10/ALDH10	270200	NM_00038	17p11.2
1			•	•	•

	Aldo-keto reductase family 1, member			
	A1/dihydrodiol	103830	103830 NM_00606	1033-032
	dehydrogenasc/AKR1A1		9	
	Aldo-keto reductase family 1, member		30100 144	
	C1/dihydrodiol	600449	00133	10p15-p14
	dehydrogenase/AKR1C1		m	•
	Aldo-keto reductase family 1, member		00000 3 414	
	C3/dihydrodiol	603966	NM_00373	10p15-p14
	dehydrogenase/AKR1C3		ν	•
	Aldo-keto reductase family 1, member	600451	****	10-16-14
Aldo-Keto	C4/chlorodecone reductase/AKR1C4	000431		l top15-p14
Reductases	Aldo-keto reductase family 7, member		02000	
	A2/aflatoxin aldehyde	603418	NM_00368	****
	reductase/AKR7A2		6	
	Carbonyl reductase 1/CBR1	114830	NM_00175	21,222,12
	Carbonyl reductase 2/CBR2	****	****	chr. 11
	Carbonyl reductase 3/CBR3	603608	NM_00123 6	21q22.2
	Sepiapterin reductase (7,8-		0.000	
	dihydrobiopterin:NADP+	182125	NM_00312	2p14-p12
	oxidoreductase)/SPR		4	1
	Z-crystallin/quinone reductase/CRYZ	123691	L31521	1p31-p22
•	Z-crystallin-like/quinone reductase-	000009	NM_00511	1,00,10
Oninone	like/CRYZL1	02220	1	1.77417
Oxidoreduct	NAD(P)H menadione oxidoreductase		00000 JAIX	
ases	1, dioxin-	125860	06000_MINI	16q22.1
	inducible/NMOR1/diaphorase 4/DIA4		າ	•

		NIA DADAH			
		2, dioxin-inducible/NMOR2	160998	160998 NIM_00090	6pter-q12
		Flavin-containing monooxygenase 1/FMO1	136130	NM_00202	1923-925
		Flavin-containing monooxygenase 3/FMO3	136132	AH006707	1923-925
		Flavin-containing monooxygenase 4/FMO4	136131	NM_00146 0	1923-925
		Flavin-containing monooxygenase 5/FMO5	603957	NM_00146 1	1421.1
Flavin-	Flavin-	Monoamine Oxidase A; MAOA	309850	M69226	Xp11.23
Dependent	Dependent	Monoamine Oxidase B; MAOB	309860	M69177	Xp11.23
Oxidoreduct ases	Oxidoreduct ases	Xanthine dehydrogenase/XDH	278300	VM_00037	
		Aldehyde oxidase 1/AOX1	602841	NM_00115 9	2q33
		Copper-containing amine oxidase/AOC3	603735	NM_00373 4	17q21
		sulfite oxidase/SUOX	272300	272300 NM_00045	**
		Dihydropyrimidine dehydrogenase (5-fluorouracil detoxification)	274270	U09178	1p22
		Peroxisome proliferative activated receptor, alpha/PPARA	170998	170998 NM_00503	22q12- q13.1
	Peroxisome Proliferation	Peroxisome Peroxisome proliferative activated Proliferation receptor, gamma/PPARG	601487	NM_00503	3p25
		Peroxisome proliferative activated receptor, delta/PPARD	180231	NM_00623 8	1921.3
	· ·	peroxisome biogenesis factor 1/PEX1 602136	n	AB008112	7q21-q22

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		acyl-Coenzyme A oxidase 1/ACOX1 (peroxisomal)	264470	NM_00403 5	17q25
	Oxidation	acyl-Coenzyme A oxidase 2, branched chain/ACOX2 (peroxisomal)	601641	NM_00350 0	3p14.3
		acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain precursor/ACADS (mitochondrial)	201470	NM_00001	12q22-qter
		acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain/ACADM (mitochondrial)		201450 NM_00001	1p31
		acyl-Coenzyme A dehydrogenase, long chain/ACADL (mitochondrial)	201460	NM_00160 8	2q34-q35
		hydroxyacyl-Coenzyme A dehydrogenase, type IVHADH2	602057	NM_00449 3	***
·		enoyl-Coenzyme A hydratase 1/ECH1 (peroxisomal)	969009	NM_00139 8	19413
	 Sulfate Unit Activation	3-prime-phosphoadenosine 5-prime- phosphösulfate synthase 1/PAPSS1	603262	NM_00544 3	49
		Phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1	171150	171150 NM_00105	16p12.1- p11.2
		Phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2	601292	NM_00105 4	16p12.1- p11.2
		Phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3	600641	L19956	16p11.2
		Sulfotransferase, family 1C, member 3/SULT1C1	602385	U66036	2q11.1- q11.2
		Dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 NM_00316 member 1/SULT2A1	125263	NM_00316	19q13.3

	Sulfotransferase, family 2B, member 1/SULT2B1	604125	NM_00460 5	19q13.3
	Estrogen-preferring sulfotransferase/STE	600043	NM_00542 0	4q13.1
	N-deacetylase/N-sulfotransferase (heparan glucosaminyl)/NDST1	600853	U18918	5q32-q33.3
	N-deacetylase/N-sulfotransferase (heparan glucosaminyl)/NDST2	603268	NM_00363 5	10q22
Sulfation	N-deacetylase/N-sulfotransferase (heparan glucosaminyl)/NDST3	603950	NM_00478 4	****
	Carbohydrate sulfotransferase 1 (chondroitin 6/keratan)/CHST1	603797	NM_00365 4	11p11.2- p11.1
	Carbohydrate sulfotransferase 2 (chondroitin 6/keratan)/CHST2	603798	****	7q31
	Carbohydrate sulfotransferase 3 (chondroitin 6/keratan)/CHST3	603799	NM_00427 3	** ** **
	Cerebroside sulfotransferase (3'- phosphoadenylylsulfate:galactosylcera mide 3')/CST	602300	602300 NM_00486	* * * * * * * * * * * * * * * * * * *
	Heparan sulfate (glucosamine) 3-0-sulfotransferase 1/HS3ST1	603244	NM_00511 4	***
	Heparan sulfate (glucosamine) 3-0-sulfotransferase 2/HS3ST2	604056	NM_00604 3	16p12
	Heparan sulfate (glucosamine) 3-O-sulfotransferase 3A1/HS3ST3A1	604057	NM_00604 2	17p12- p11.2
	Heparan sulfate (glucosamine) 3-O-sulfotransferase 3B1/HS3ST3B1	604058	NM_00604 1	17p12- p11.2
	Heparan sulfate (glucosamine) 3-0-sulfotransferase 4/HS3ST4	604059	AF105378	16p11.2

Sulfhydrylati	Methylguanine methyltransferase (O6-Sulfhydrylati alkylguanine detoxification)	156569	M29971	10q26
uo	thiotransferase/rhodanese/TST	180370	D87292	22q11.2- qter
	UDP glycosyltransferase 1/UGT1	191740	NM_00107 2	Chr. 12
	UDP glycosyltransferase family 2, member B4/UGT2B4	600067	600067 NM_00107	4q13
Ş	UDP glycosyltransferase family 2, member B7/UGT2B7	890009	NM_00107 4	1q14
UDF- Glycosyltran	UDP glycosyltransferase family 2, member B10/UGT2B10	020009	NM_00107	**
Sierases	UDP glycosyltransferase family 2, member B15/UGT2B15	690009	U06641	4q13
	UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107	1914
	UDP glycosyltransferase 8/UGT8	162109	0260EN	4q26
	UDP-glucuronosyltransferase	218800	AJ005162	Chr.2
Carbon Unit		250850	NM_00042 9	10q22
for SAM	methionine adenosyltransferase II, alpha/MAT2A	601468	NM_00591 1	2p11.2
	Folate Receptor Alpha/FOLR1	136430	M28099	1q13.3-q13.
	Folate Receptor Beta/FOLR2	136425	AF000380	1q13.3-q13.
	Folate Receptor Gamma/FOLR3	602469	Z32564	***
	Folate Transporter (SLC19A1)	600424	U19720	21q22.3
	Vitamin B12 binding protein	275350	NM_000355 22q11.2-qter	22q11.2-qte
-	folylpolyglutamate synthetase/FPGS	136510	M98045	9cen-q34
	gamma-glutamyl hydrolase/GGH	601209	US5206	***
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Methylenetetrahydrofolate reductase/MTHFR Dihydrofolate reductase/DH 5.10-methylenetetrahydrofolate cyclohydrolase, 10- formyltetrahydrofolate synthetase/MTHFD1 5.10-methonyltetrahydrofolate synthetase/MTHFD1 5.10-methenyltetrahydrofolate synthetase (5-formyltetrahydrofola synthetase (5-formyltetrahydrofola synthetase (formyltransferase, phosphoribosylglycinamide synthetase, phosphoribosylglycinamide synthetase, phosphoribosylaminoimidaz folate hydrolase 1/FOH1	se/DHFR /drofolate slate Irofolate trahydrofolate amide	126060 126060 172460 604197	236250 U09806 126060 J00140 172460 NM_005956 604197 NM_006441	1p36.3 5q11.2-q13.2 14q24 Chr. 15
Carbon Unit Activation for Folate	se/DHFR drofolate late lrofolate trahydrofolate amide	236250 126060 172460 604197	J00140 J00140 NM_005956	1p36.3 5q11.2-q13. 14q24 Chr. 15
Carbon Unit Activation for Folate	drofolate late lrofolate trahydrofolate amide	172460	J00140 NM_005956 NM_006441	5q11.2-q13. 14q24 Chr. 15
Carbon Unit Activation for Folate	drofolate slate trofolate trahydrofolate amide	172460	NM_005956	
Carbon Unit Activation for Folate	slate rrofolate trahydrofolate amide	172460	NM_005956	
Carbon Unit Activation for Folate	slate rrofolate strahydrofolate amide	172460	NM_005956	
Carbon Unit Activation for Folate	Irofolate trahydrofolate amide	172460	NM_005956	
Carbon Unit Activation for Folate	Irofolate strahydrofolate amide	172460	NM_005956	
Carbon Unit Activation for Folate	Irofolate strahydrofolate amide	172460	NM_005956	
Carbon Unit Activation for Folate	Irofolate strahydrofolate amide	604197	NM_006441	
Carbon Unit Activation for Folate	trahydrofolate amide	604197	NM_006441	
Carbon Unit Activation for Folate	amide	604197	NM_006441	
Activation for Folate	phoribosylglycinamide yltransferase,			
for Folate	yltransferase,			
	nhoriboevlotveinamide			
·	promobile permanna			
	netase,			
folate hydrola	phosphoribosylaminoimidazole	138440	138440 NM 000819	21q22.1
	folate hydrolase 1/FOH1	600934	600934 NP_004467	11q14
6-pyruvoyl tet	6-pyruvoyl tetrahydrobiopterin			
synthase/PTPS		261640	Q03393	1q22.3-q23.3
serine hydrox	serine hydroxymethyltransferase 1			
(soluble)/SHMT1		182144	182144 NM_004169	17p11.2
serine hydrox	serine hydroxymethyltransferase 2			
(mitochondria	(mitochondrial)/SHMT2	138450	138450 NM_005412	12q13
Glycine amine	Glycine aminotransferase/glycine			
cleavage T pr	cleavage T protein/GAT	238310	238310 NM_0004813p21.2-p21.	3p21.2-p21.
5-methyltetral	5-methyltetrahydrofolate-			
homocysteine	ocysteine			
methyltransfe	methyltransferase/methionine	156570	156570 NM_000254	1943

Phase II
Drug
Metabolism
(conjugation
and
catabolism)

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	glutamate			
	formiminotransferase/dihydrofolate			
	synthetase	229100	****	***
	catechol-O-methyltransferase/COMT	116790	NM_00075 4	22q11.2
Mothylotics	phenylethanolamine N-methyltransferase/PNMT	171190	171190 NM_00268	17q21-q22
Manual Ma	nicotinamide N- methyltransferase/NNMT	800009	NM_00616 9	11923.1
	Thiopurine methyltransferase (6- mercaptopurine detoxification)	187680	U12387	6p22.3
	pyruvate dehydrogenase E1-alpha subunit/PDHA1	312170	L48690	Xp22.2- p22.1
Carbon Unit	Carbon Unit beta/PDHB	179060	NM_00092 5	3p13-q23
for Acetyl- CoA	pyruvate dehydrogenase complex, lipoyl-containing component X/E3-binding protein/PDX1	245349	NM_00347	11p13
	pyruvate dehydrogenase complex E3 subunit/DL.D	246900	NM_00010 8	7q31-q32
	sterol-O-acyl transferase 1/SOAT1	102642	L21934	1925
	sterol-O-acyl transferase 2/SOAT2	601311	***	chr. 12
Acylation	N-acetyltransferase 1/arylamide acetylase 1/NAT1	108345	NM_00066	8p23.1- p21.3
	N-acetyltransferase 2/arylamide acetylase 2/NAT2	243400	243400 NM_00001	8p23.1- p21.3
	cystathionine-beta-synthase/CBS	236200	NM_00007	21q22.3

	cystathionase/cystathionine gamma-lyase/CTH	219500	NM_00190 2	Chr.16
Glutathione Synthesis	glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	NM_00149	6p12
	glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), regulatory (30.8kD)/GLCLR	601176	601176 NM_00206	1p22.1
	glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
,	Glutathione-S-transferase 6	138391	****	****
	Glutathione-S-transferase, alpha 1/GSTA1	138359	L13269	6p12.2
	Glutathione-S-transferase, alpha 2/GSTA2	138360	M15872	6p12.2
	Glutathione-S-transferase, kappa 1/GSTK1	602321	****	**
	Glutathione-S-transferase 1/MGST1 (microsomal)	138330	AH003674	Chr.12
	Glutathione-S-transferase 2/MGST2 (microsomal)	601733	NM_00241 3	4q28-q31
	Glutathione-S-transferase, mu 1- like/GSTM1L	138270	* * *	Chr. 3
	Olukalilolic-3-traffsiciase, iliu	138350	J03817	1p13.3
Glutathione Transferase	Glutathione-S-transferase, mu 2/GSTM2 (muscic)	138380	NM_00084 8	1p13.3
	Glutathione-S-transferase, mu 3/GSTM3 (brain)	138390	NM_00084 9	1p13.3
	Glutathione-S-transferase, mu 4/GSTM4	138333	NM_00085 0	1p13.3

	Glutathione-S-transferase, mu 5/GSTM5 (brain/lung)	138385	NM_00085 1	1p13.3
	Glutathione-S-transferase, pi/GSTP1	134660	NM_00085 2	11913
	Glutathione-S-transferase, theta 1/GSTT1	600436	NM_00085	22q11.2
	Glutathione-S-transferase, theta	600437	NM_00085 4	22q11.3
	Glutathione-S-transferase, zeta 1/maleylacetoactetate isomerase/MAAI/GSTZ1	603758	NM_00151	14q24.3
<i>*</i> -	Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
Glutamyltra	Odinina-grutaniyin anspeptitase 2000-rs	137181	AH002728	22q11.1
nspeptidase		137168	NM_00412 1	* * * *
	paraoxonase 1/PON1 (arylesterase)	168820	AH004193	7q21.3
	paraoxonase 2/PON2	602447	L48513	7q21.3
	paraoxonase 3/PON3	602720	L48516	7q21.4
	esterase C/ESC (acetyl esterase)	133270	*****	***
	esterase A4/ESA4	133220	****	11q13-q22
	esterase B/buteryl esterase/ESB	133360	***************************************	, ,
	(erythrocyte)	007551	<b>!</b>	+ + + +
	esterase B3/ESB3	133290	***	Chr.16
	esterase			
	A5/A7/acetylesterase/ESA5/ESA7	133230	* * * *	***
Esterases	(brain)			
	acetylcholinesterase/ACHE	100740	M55040	7q22

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		butyrylcholinesterase, 1/serum			
		cholinesterase 1/BCHE1	177400	177400 NM_000055Bq26.1-q26.2	3q26.1-q26.
		butyrylcholinestarase 2/serum			
		cholinesterase 2/BCHE2	177500	****	2q33-q35
		egasyn/esterase 22	129905	AF177775	***
		neuropathy target esterase/NTE	603197	603197 NM_006702	19p
		carboxylesterase 1/serine esterase/CES1 (hepatic)	114835	NM_00126 6	16q13- q22.1
Hydratases and Lyases		arylacetamide deacetylase/AADAC	600338	NM_00108 6	3q21.3- q25.2
		acyl-CoA thioester hydrolase 1, long	703007	***************************************	*****
<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>		chain/acyl-CoA thioesterase 1/ACT1	007700		† † † †
		acyl-CoA thioester hydrolase 2, long chain/acyl-CoA thioesterase 2/ACT2	602587	***	****
	Thioesterase		133280	M13450	13q14.11
		hydroxyacyl glutathione hydrolase;			
		glyoxalase 2/HAGH	138760	138760 NM_005326	16p13
		esterase D/S-formylglutathion hydrolase/ESC (thioesterase)	133280	M13450	13q14.11
		aminoacylase 1/ACY1	104620	99000_MN	3p21.1
	Amidase	aminoacylase 2/ACY2/aspartoacylase (Canavan disease)/ASPA	271900	NM_00004 9	17pter-p13
		fatty acid amide hydrolase/FAAH	602935	NM_00144 1	1p34-p35
	Epoxide	epoxide hydrolase 1/EPHX1 (microsomal)	132810	NM_00012 0	1p11-qter
	II) ul atases	cpoxide invuloiase 2/EF fix2	132811	***	8p21-p12
	Proteases	bleomycin hydrolase/BLMH	602403	602403 NM_000386	17q11.2

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		Multidrug resistance protein MDR3/P-glycoprotein 3/PGY3	602347	X06181	7q21.1
		Familial intrahepatic cholestasis 1, (progressive, Byler disease and benign 602397 recurrent) /FIC1	602397	NM_00560	18q21
		Bile salt export pump/BSEP	603201	NM_00374 2	2q24
		Microsomal triglyceride transfer protein large subunit/MTP	157147	NM_00025	4q22-q24
		Solute carrier family 6, member 6/SLC6A6 (taurine)	186854	U16120	3p25-q24
		Solute carrier family 10, member 1/SLC10A1 (taurocholate)	182396	NM_00304	chr. 14
	Transporter	Transporters 2/SLC10A2 (taurocholate)	601295	NM_00045 2	13q33
		Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1- q11.1
		Solute carrier family 19, member 1/SLC19A1 (reduced folate)	600424	U19720	21q22.3
····		Solute carrier family 21, member 3/SLC21A3 (organic anion)	602883	NM_00507 5	12p12
		Solute carrier family 22, member 1/SLC22A2 (organic cation)	602607	NM_00305 8	6q26
		multidrug resistance protein MDR1	171050	X96395	7q21.1
		multidrug resistance associated protein MRP2/CMOAT		601107 NM_00039	10q24
<del></del>		multidrug resistance protein MDR3/P-glycoprotein 3/PGY3	602347	X06181	7q21.1

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		Bile acid Cocuzyme A: amino acid N-		02100 744	
		acyltransferase (glycine N-	602938	602938 NIM - 001 / 0	9q22.3
		choloyltransferase)/BAAT		<b>→</b>	
		cytochrome P450, subfamily XLVI	604007	99900 MM	1 00 1
	Pilo Colt	(cholesterol 24-hydroxylase)/CYP46	004087		14q32.1
	Synthesis	cytochrome P450, subfamily VIIA			
	Synthesis	(cholesterol 7-a-hydroxylase),	118455	M89803	8q11-q12
	,	polypeptide 1/CYP7A1			•
		cytochrome P450, subfamily VIIB			
		(oxysterol 7-a-hydroxylase),	603711	AF029403	8q21.3
Canalicular		polypeptide 1/CYP7B1			•
Optake and		ATPase, Na+/K+ transporting, alpha 1	102210	NM 00070	
יסווכבוונו מנוס		polypeptide/ATP1A1	182310	,	tp13-p11
3		ATPase, Na+/K+ transporting, alpha 1	102260	NM 00167	13q12.1-
		polypeptide-like/ATP1A1L	182300	9	q12.3
		ATPase, Na+/K+ transporting, alpha 2	102740	NM 00070	1
		polypeptide/ATP1A2	182340	2	1921-923
		ATPase, Na+/K+ transporting, beta 1	107220	NM_00167	1.00
		polypeptide/ATP1B1	102230	7	C7b-77b1
		ATPase, Na+/K+ transporting, beta 2	10001	31771A	1.5
		polypeptide/ATP1B2	107331	V10043	1/b
		ATPase, Na+/K+ transporting, beta 3	601067	NM_00167	1.00
		polypeptide/ATP1B3	00100	6	67b-77bc
		solute carrier family 4,		NEW DOOR	
		bicarbonate/chloride anion exchanger,		ברחחם היווין	
		member 1/SLC4A1	109270	7	17q21-q22
		solute carrier family 4, sodium		APA 00275	
		bicarbonate cotransporter, member	603345	603345   MINI_00373	4q21
	Bile	4/SLC4A4		,	

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<u> </u>	Concentratio	Concentratio solute carrier family 4, sodium		NIM 00279	
	<b>s</b>	bicarbonate cotransporter, member		0/500_MINI	
		5/SLC4A5	603318	Ø	4q21
		Solute carrier family 9, member A2/SLC9A2 (sodium/hydrogen ion)	600530	NM_00304 8	2q11.2
		Solute carrier family 9, member		* * * *	
		A3/SLC9A3 (sodium/hydrogen ion)	182307		5p15.3
		chloride channel 5/CLCN5	300008	NM_00008 4	Xp11.22
		chloride channel, calcium activated,			
		family member 1/CLCA1	906209	603906 NM_001285 1p31-p22	1p31-p22
		chloride channel, calcium activated,			
	-	family member 2/CLCA2	604003	604003 NM_006536*****	***
	. "	cystic fibrosis transmembrane conductance regulator/CFTR	602421	602421 NM_00049	7q31.2
		aquaporin 1/AQP1	107776	NM_00038 5	7p14
		aquaporin 3/AQP3	600170	NM_00492 5	9p13
	Bilo	Cholecystokinin/CCK	118440	118440 L00354	3pter-p21
	Secretion	Cholecystokinin A receptor/CCKAR	118444	118444 L13605	4p15.2-p15.
		Cholecystokinin B receptor/CCKBR	118445	118445 L08112	11p15.5-p15
		Cytoplasinic cystonic conjugate pera lyase/glutamine transaminase	600547	600547 NM_00405	Chr.9
		renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
		alanyl (microsomal) aminopeptidase/aminopeptidase M/ANPEP	151530	NM_00115	15q25-q26
				A	

Excretion

<b></b>	Sulfatase (Morquio	253000	NM_00051 2	16q24.3
	Iduronate-2-sulfatase (Hunter syndrome)/IDS	309900	309900 NM_00020	Xq28
Hydratases and Lyases	Arylsulfatase A/steroid sulfatase/ARSA	250100	NM_00048 7	22q13.31- qter
	Arylsulfatase B/steroid sulfatase/ARSB	253200	253200 NM_00004	5q11-q13
	Arylsulfatase C, isozyme s/steroid sulfatase/ARCS1	308100	NM_00035	Xp22.32
	rujisunatase Listendiu	300002	****	Xp22.3
	Arylsulfatase E/steroid sulfatase/ARSE	300180	NM_00004	Xp22.3
· -	Arylsulfatase F/steroid sulfatase/ARSF	300003	NM_00404 2	Xp22.3
	glucuronidase, beta/GUSB	253220	NM_00018	7q21.11
	renal transport of beta-amino acids/AABT	109660	* * * *	Chr.21
·	Solute carrier family 3 member 1/SLC3A1 (aa transporter)	104614	**	2p16.3
<del>- 1</del>	Solute carrier family 5 member 2/SLC5A5 (Na/glucose transporter)	182381	A56765	16p11.2
	Solute carrier family 6, member 6/SLC6A6 (taurine)	186854	U16120	3p25-q24
	Solute carrier family 7, member 9/SEC7A9 (neutral AA)	604144	* * *	19q13.1
Uptake and	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1-

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	Transporters	Transporters phosphate), member 1/SLC17A1	182308	NM_00507	6p23-p21.3
		Solute carrier family 22, member 1/SLC22A2 (organic cation)	602607	NM_00305 8	6926
		Solute carrier family 22, member 1- like/SLC22A1L (organic cation)	602631	AF037064	11p15.5
		Solute carrier family 22, member 4/SLC22A4 (organic cation)	604190	NM_00305	Chr. 5
		Solute carrier family 22, member		NM_00306	5q33.1
. —		5/SLC22A5 (carnitine)	603377	0	ļ
		Solute carrier family 34, member 1/SLC34A1 (sodium phosphate)	182309	NM_00305	5q35
		H+-ATPase beta 1 subunit /ATP6B1	267300	AH007312	2cen-q13
		solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4	603345	NM_00375	4921
Renal		solute carrier family 4, sodium		NM 00378	
Tubular Uptake and		bicarbonate cotransporter, member 5/SLC4A5	603318	× × × × × × × × × × × × × × × × × × ×	4921
Concentratio n		carbonic anhydrase II/CA2	259730	NM_00006	8922
	Acidosis	carbonic anhydrase IV/CA4	114760	NM_00071	17q23
		carbonic anhydrase XII/CA12	603263	AF051882	15q22
-		solute carrier family 4, bicarbonate/chloride anion exchanger		NM_00034	
		member 1/SLC4A1	109270	2	17q21-q22
		Solute carrier family 9, member A1/SLC9A1 (sodium/hydrogen ion)	107310	M81768	1p36.1-p35

	Solute carrier family 9, member A2/SLC9A2 (sodium/hydrogen ion)	600530	NM_00304   8	2q11.2
	Solute carrier family 9, member		1	
	A3/SLC9A3 (sodium/lıydrogen ion)	182307		5p15.3
Lithosis	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398	17p11.1- a11.1
Sodium Tolerance	3'(2'), 5'-bisphosphate nucleotidase 1/BPNT	604053	NM_00608 5	****
	chloride channel 5/CLCN5	300008	NM_00008 4	Xp11.22
	chloride channel Ka, kidney/CLCNKA 602024	602024	NM_00407 0	1p36
	chloride channel Kb, kidney/CLCNKB 602023	602023	NM_00008 5	1p36
	solute carrier family 12 (sodium/potassium/chloride transporters), member 1/SLC12A1	600839	NM_00033	15q15- q21.1
	solute carrier family 12 (sodium/potassium/chloride transporters), member 2/SLC12A2	600840	NM_00104 6	5q23.3
	(sodium/chio.ide transporters),	896009	NM_00033 9	16q13
	ATPase, Na+/K+ transporting, alpha 1 polypeptide/ATP1A1	182310	NM_00070	1p13-p11
Urine Concentratio	Urine ATPase, Na+/K+ transporting, alpha 1 polypeptide-like/ATP1A1L	182360	NM_00167 6	13q12.1- q12.3
a	ng, alpha 2	182340	182340 NM_00070	1921-923

	ATPase Na+/K+ transmerting hete 1		F) 100 1414	
	polypeptide/ATP1B1	182330	70100 L	1q22-q25
	ATPase, Na+/K+ transporting, beta 2 polypeptide/ATP1B2	182331	X16645	17p
	ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3	601867	NM_00167 9	3q22-q23
	(nephrogenic diabetes	304800	NM_00005 4	Xq28
	aquaporin 1/AQP1	107776	NM_00038 5	7p14
	aquaporin 2/AQP2	107777	NM_00048 6	12q13
	aquaporin 3/AQP3	600170	NM_00492 5	9p13
	aquaporin 6/AQP6	601383	NM_00165	12q13
	Superoxide Dismutase 1/SOD1 (soluble)	147450	NM_00045 4	21q22.1
Superoxide Dismutase	Superoxide Dismutase 2/SOD2 (mitochondrial)	147460	X65965	6q25.3
	Superoxide Dismutase 3/SOD3 (extracellular)	185490	NM_00310	4pter-q21
	aldehyde dehydrogenase 1/ALDH1 (liver cytosol)	100640	AH002598	9q21
	aldehyde dehydrogenase 2/ALDH2 (liver mitochondria)	100650	K03001	12q24.2
	3/acetaldehyde	100660	M74542	17p11.2

			anchyuc uchyurogenase 5/acetaldehyde	100670	NM_00069	9p13
		Aldehyde	aldehyde dehydrogenase 5, member A1/succinic semialdehyde dehydrogenase/ALDH5A1	271980	NM_00108 0	6p22
		ase	divingue wenyungenase 6/acetaldehyde 44brituse wessa (ALDIIC	600463	09000 WN	15q26
			7/acetaldehyde	600466	NM_00069 4	11913
	·		aldehyde dehydrogenase 8/ALDH8	601917	NM_00069 5	chr. 11
			aldehyde dehydrogenase 9/g- aminobutyraldehyde dehydrogenase/ALDH9	602733	0000 NIM	1q22-q23
			aldehyde dehydrogenase 10/ALDH10	270200	NM_00038	17p11.2
		Aldehyde Dehydrogen ase	Aldehyde oxidase 1/AOX1	602841	NM_00115	2q33
Metabolism	Protection		glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	NM_00149 8	6p12
of Reactive Oxygen and Nitrogen	from Reactive Oxygen and		glutamate-cysteine ligase (gamma- glutamylcysteine synthetase), regulatory (30.8kD)/GLCLR	601176	NM_00206	1p22.1
Species	Nitrogen Species	Glutathione	glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
			glutathione peroxidase/GPX1	138320	M21304	3p21.3
			glutathione peroxidase GPX2	138319	X68314	14q24.1:
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	glutathione peroxidase GPX3	138321	X58295	5q32-q33.1
	glutathione peroxidase GPX4	138322	X71973	19p13.3
	glutathione peroxidase GPX5	603435	AJ005277	***
	glutathione reductase	138300	X15722	8p21.1
	metallothionein 1A/MT1A	156350	NM_00595 3	16q13
	metallothionein 1B	56349	AH001510	16q13
	metallothionein 1E	156351	M10942	16q13
Metallothion	Metallothion metallothionein 1F	156352	M10943	16q13
ein	metallothionein 1G	156353	103910	16q13
	metallothionein 2A/MT2A	156360	NM_00595	16q13
	metallothionein 3	139255	NM_00595 4	16q13
	glucose-6-phosphate dehydrogenase/G6PD (mitochondrial)	305900	NM_00040 2	Xq28
	8-oxoguanine DNA glycosylase/CGG1	601982	NM_00254 2	3p26.2
	Peptide methionine sulfoxide reductase/MSRA	601250	***	***
Miscellaneou	succinate dehydrogenase complex, subunit C, integral membrane protein/SDHC	602413	NM_00300	1921
<b>^</b>	phospholipase A2 group IB/PLA2G1B	172410	NM_00092 8	12q23- q24.1
	lipoprotein, Lp(a)/LPA	152200	NM_00557	6q27
	Catalase/CAT	115500	NM_00175	11p13

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			thioredoxin-dependent peroxide reductase/TDPX1	600538	NM_00580 9	13q12
		IgE	interleukin 4 receptor/ILAR	147781	X52425	6p12.1-p11.2
		Production	interferon gamma/FNG	147570	L07633	12q14
		Mast Cell	mast cell growth factor/MGF	184745	NM_00399 4	12q22
		Proliferation	Proliferation interleukin 9 receptor/IL9R	300007	M84747	Xq28
			interleukin 3 receptor/IL3R)	308385	M74782	Xp22.3
			mast cell IgE receptor alpha polypeptide/FCER1A	147140	* * * * *	1923
		Degranulatio	mast cell IgE receptor beta	147138	NM_00013 9	11913
		n of Mast	mast cell IgE receptor beta polypeptide/FCER1G	147139	NM_00410 6	1923
			SH2-containing inositol 5- phosphatase/SHIP	601582	US7650	2q36-q37
			secretory granule proteoglycan peptide core/PRG1	177040	103223	10q22.1
	-		Histidine Decarboxylase	142704	M60445	15q21-q22
	•		Histamine receptor H1	600167	AF026261	3p21-p14
			Histamine receptor H2	142703	M64799	***
		Histamine	Histamine N-methyltransferase	****	D16224	chr. 2
			Amine oxidase (copper-containing) 2/AOC2	602268	D88213	17q21
			Amine oxidase (copper-containing) 3/AOC3	603735	AF054985	17q21
			aromatic L-Amino Acid Decarboxylase/AADC	107930	107930 M76180	7p11

113508 601288 601289 601290 109760 182131 182133 182134 182135 182135 601122 601122 309850 309860		tryptophan hydroxylase/TPH	191060	191060 X52836	11p15.3-p14
14-3-3 protein ZETA 14-3-3 protein BETA 14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled		14-3-3 protein ETA	113508	X78138	22q12
14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled		14-3-3 protein ZETA	601288	M86400	2p25.2-p25.
serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 6-HT receptors 6-HT2B, G protein-coupled		14-3-3 protein BETA	601289	X57346	20q13.1
protein-coupled serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled		14-3-3 protein SIGMA	601290	X57348	***
protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 6-HT3C, G protein-coupled serotonin 6-HT3C, G protein-coupled serotonin 6-HT3C, G protein-coupled serotonin 6-HT3C, G protein-coupled		serotonin 5-HT receptors 5-HT1A, G			
serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled		protein-coupled	109760	X57829	5q11.2-q13
protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 7-HT2C, G protein-coupled		serotonin 5-HT receptors 5-HT1B, G			
serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled serotonin 6-HT2C, G protein-coupled		protein-coupled	182131	M81590	6q13
protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1F, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 5-HT receptors 5-HT2C, G serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G monoamine oxidase A/MAOA monoamine oxidase B/MAOA		serotonin 5-HT receptors 5-HT1C, G			
serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G monoamine oxidase A/MAOA monoamine oxidase B/MAOA		protein-coupled	312861	U49516	Xq24
protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1F, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 5-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G protein-coupled serotonin 6-HT receptors 6-HT2C, G monoamine oxidase A/MAOA monoamine oxidase B/MAOB		serotonin 5-HT receptors 5-HT1D, G			
serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1F, G protein-coupled serotonin 5-HT receptors 5-HT2A, G protein-coupled serotonin 5-HT receptors 5-HT2B, G protein-coupled serotonin 5-HT receptors 5-HT2C, G protein-coupled serotonin fransporter monoamine oxidase A/MAOA monoamine oxidase B MAOB	Serotonin	protein-coupled	182133	M81590	1p36.3-p34.3
		serotonin 5-HT receptors 5-HT1E, G			
		protein-coupled	182132	M91467	6q14-q15
		serotonin 5-HT receptors 5-HT1F, G			
		protein-coupled	182134	L05597	3p12
		serotonin 5-HT receptors 5-HT2A, G			
		protein-coupled	182135	D87030	13q14-q21
		serotonin 5-HT receptors 5-HT2B, G			
		protein-coupled	601122	X77307	2q36.3-q37.1
<del>-                                      </del>	7	serotonin 5-HT receptors 5-HT2C, G			
		protein-coupled	312861	U49516	Xq24
		serotonin transporter	182138	X70697	17q11.1-q12
		monoamine oxidase A/ MAOA	309850	M69226	Xp11.23
-		monoamine oxidase B MAOB	309860	M69177	Xp11.23
serotonin N-Acetyltransferase/SNAT   600950   U40347		serotonin N-Acetyltransferase/SNAT	600950	U40347	17q25
tryptophan 2,3-dioxygenase/TDO2 191070 NM_005651		tryptophan 2,3-dioxygenase/TDO2	191070	NM_005651	4q31-q32

Neutrophil	eotaxin precursor/small inducible			
and	cytokine, family A, member	601156	601156 U46572	7g21.1-g21.2
Eosinophil				1-
Chemotaxis	chemotactic factor/interleukin 8/IL8	146930	146930 M26383	4q12-q13
	tryptase alpha/TPS1	191080	191080 NM_003293	Chr.16
Proteases	trýptase beta/TPS2	191081	191081 NM_003294	Chr.16
	chymase 1, mast cell/CMA1	118938	118938 NM_001836	14q11.2
	phospholipase A2 group IIA/PLA2G2A	172411	NM_00030 0	1p35
Release of	phospholipase A2 group IB/PLA2G1B	172410	NM_00092 8	12q23- q24.1
Membrane Lipids	phospholipase A2 group X/PLA2G10	603603	****	16p13.1- p12
	phospholipase A2 group IVA/PLA2G4A	600522	U08374	1925
leukotriene,	phospholipase A2 group VI/PLA2G6	603604	AF064594	22q13.1
and prostaglandi	phospholipase A2 group IVC/PLA2G4C	603602	****	chr. 19
n painways)	phospholipase A2 group V/PLA2G5	601192	NM_00092 9	1p36-p34
	phospholipase C beta 3	600230	600230 U26425	11913
	lysosomal acid lipase	278000	278000 NM_000235	10q24-q25
	CDP-choline:alkylacetylglycerol cholinephosphotransferase	* * * * *	* * *	***
	platelet activating factor receptor/PTAFR	173393	M88177	1p35-p34.3
177	platelet activating factor acetylhydrolase 1/PAFAH1	601690	NM_00508 4	6p21.2-p12
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riaieiei	Diatelet activating factor			
Activating Factor (PAF)	acetylhydrolase, isoform 1B, alpha	601545	NM_00043	17p13.3
	prairies activating factor acetylhydrolase, isoform 1B, beta	602508	NM_00257 2	11923
	prairies activating tactor acetylhydrolase, isoform 1B, gamma	603074	NM_00257 3	19q13.1
	platelet activating factor acetylhydrolase 2/PAFAH2	602344	NM_00043	* * *
	arachidonate 5-lipoxygenase/ALOX5	152390	NM_00069 8	Chr.10
	arachidonate 5-lipoxygenase- activating protein/FLAP/ALOX5AP	603700	NM_00162 9	13q12
	leukotriene A4 hydrolase/LTA4H	151570	NM_00089 5	12q22
	leukotriene C4 synthase/LTC4S	246530	NM_00089	5693
Leukotriene	Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
	Odinina-Brutaniyinalispepindase 2700tto	137181	AH002728	22q11.1
	Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412 1	** **
	renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
	cysteinyl leukotriene receptor 1/CYSLT1	300201	NM_00663 9	Xq13-q21
	leukotriene b4 receptor (chemokine receptor-like 1)/LTB4R	601531	NM_00075	14q11.2- q12

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		prostaglandin endoperoxide synthetase			
		1/COX1/PTGS1	176805	AH001520	9q32-q33.3
		prostaglandin endoperoxide synthetase			
		2/COX2/PTGS2	600262	600262 NM_000963 1925.2-925.3	1q25.2-q25.3
		thromboxane A synthase 1/TBXAS1	274180	274180 SEG_D3461	7q34
		prostaglandin D2 synthase	602598	602598 M61900	***
		prostaglandin I2 synthase/prostacyclin			
		synthase/PTGIS	601699	601699 SEG_D8339	20q13
		prostaglandin E receptor 1, EP1			
		subtype/PTGER1	1.76802	176802 NM_000955	19p13.1
		prostaglandin E receptor 2, EP2			
	Prostaglandi	Prostaglandi subtype/PTGER2	176804 *****	****	5p13.1
	r rostagianui ne	prostaglandin E receptor 3, EP3			
	3	subtype/PTGER3	176806	176806 NM_000957	1p31.2
		prostaglandin E receptor 4, EP4			
		subtype/PTGER4	601586	601586 NM_000958	5p13.1
Mast Cell		prostaglandin F receptor/PTGFR	600563 L24470	L24470	1p31.1
and T-Cell		prostaglandin F2 receptor negative			
Response		regulator/PTGFRN	601204   U26664		1p13.1-q21.3
		prostaglandin I2			
		receptor/PTGIR/prostacyclin receptor	600022	600022 SEG_HUMI	19q13.3
		15-hydroxyprostaglandin			
٠	-	dehydrogenase/HPGD	601688	601688 NM_000860	4q34-q35
		aldo-keto reductase family 1, member			
		C2/AKR1C2	600450	600450 NM_001353	10p15-p14
		myeloperoxidase/MPO	254600	102694	17q23.1
		eosinophil peroxidase/EPX	131399	NM_00050	****
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Viveton	calreticulin/CALR	109091	CALR	19p13.2
ACIIVALIOII	calnexin/CANX	114217	L18887	5q35
	ceruloplasmin (ferroxidase)/CP	117700	NM_00009 6	3q21-q24
	MHC class II transactivator/MHC2TA	600005	NM_00024 6	16p13
	MHC class II HLA DR-alpha chain/HLA-DRA	142860	X83114	6p21.3
	MHC class II HLA DR-beta chain/HLA-DRB	142857	M11161	6p21.3
	MHC class II HLA DP-alpha chain/HLA-DPA	142880	M23905	6p21.3
	MHC class II HLA DP-beta chain/HLA-DPB	142858	AH002893	6p21.3
	MHC class II HLA DM-alpha chain/HLA-DMA	142855	NM_00612 0	6p21.3
Antigen	MHC class II HLA DM-beta chain/HLA-DMB	142856	NM_00211 8	6p21.3
Presentation	Presentation MHC class II HLA DQ-alpha chain/HLA-DQA	146880	M11124	6p21.3
	MHC class II HLA DQ-beta chain/HLA-DQB	****	M24364	6p21.3
	MHC class II HLA DN-alpha chain/HLA-DNA	142930	X02882	6p21.3
	MHC class II HLA DO-beta chain/HLA-DOB	629009	NM_00212 0	6p21.3
	MHC class II antigen gamma chain/CD74	142790	K01144	5q32

	antigen peptide transporter 1/MHC 1/TAP1	170260	NM_00059	6p21.3
	antigen peptide transporter 2/MHC 2/TAP2	170261	NM_00054 4	6p21.3
	T-cell antigen receptor, alpha subunit/TCRA	186880	Z24457	14q11.2
	T-cell antigen receptor, beta subunit/TCRB	186930	AF011643	7q35
	Ticell antigen receptor, gamma subunit/TCRG	186970	M17325	7p15-p14
	Tecell antigen receptor, delta subunit/TCRD	186810	L36384	14q11.2
T-Cell Receptor	thymocyte antigen receptor complex CD3G, gamma polypeptide (TiT3 complex)/CD3G	186740	186740 NM_00007	11q23
	thymocyte antigen receptor complex CD3D, delta polypeptide (TiT3 complex)/CD3D	186790	186790 NM_00073	11923
	thymocyte antigen receptor complex CD3E, epsilon polypeptide (TiT3 complex)/CD3E	186830	186830 NM_00073	11923
	thymocyte antigen receptor complex CD3Z, zeta polypeptide (TiT3 complex)/CD3Z	186780	NM_00073	1922-923
	ataxia telangiectasia mutated (includes complementation groups A, C and D)/ATM	208900	NM_00005	11922.3
	recombination activating gene	179615	NM_00044 8	11p13

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	reconnuntation activating gene		Ł	
	J. B. A.C.3	179616	M94633	11p13
	interleukin 7 receptor/IL7R	146661	NM_00218 5	5p13
	v-myb avian myeloblastosis viral		NM_00537	
ارم الم	oncogene homolog/MYB	189990	2	6q22
Description	core binding factor, alpha 1			
Rearrangem	subunit/CBFA1	600211	AH005498	6p21
ent	core-binding factor, beta			
3	subunit/PEBP2B/CBFB	121360	L20298	16q22
	ligase I, DNA, ATP-dependent/LIG1	126391	NM_00023	19q13.2- q13.3
	ligase IV, DNA, ATP-dependent/LIG4	601837	NM_00231	13q22-q34
	X-ray repair, complementing defect in			
	kD/KU80/XRCC5	194364	****	2a35
	thursid autocation 70		77.000 7.00	
	urytota autoantigen, 70 kD/KU70/G22P1	152690	NM_00146 9	22q11-q13
	T-cell antigen T4/CD4	186940	X87579	12pter-p12
	T-cell antigen CD8, alpha polypeptide (p32)/CD8A	186910	NM_00176 8	2p12
	T-cell antigen CD8, beta polypeptide/CD8B	186730	AH003859	2p12
	T-cell antigen CD28 (Tp44)/CD28	186760	NM_00613 9	2q33-q34
	cytotoxic T-lymphocyte-associated 4/CTLA4	123890	L15006	2q33

 112203 NM_00519 3q21	601020 NM_00688 3q21	176947 S69911 2q12	151460 M23492 1q31-q32	600489 NM_00616 18q23	600490 ***** 20q13.2- q13.3	602698 L41066 16q13-q24	602699 L41067 *****	147730 X01057 10p15-p14	146710 M26062 22q11.2-q13	308380 D11086 Xq13	147880 X12830 1q21	300007 M84747 Xq28	300119 S80963 Chr.X	300130 X95302 Xq24	601070 U31628 10p15-p14	190180 M60315   19913.1-913	190220 M19154 1q41	190230 X14149 14q24
CD80 antigen (CD28 antigen ligand 1, B7-1 antigen)/CD80	CD86 antigen (CD28 antigen ligand 2, 87-2 antigen)/CD86	rotein P70	Teukocyte common antigem	nuclear factor of activated T-cells, 60 cytoplasmic 1/NFATC1	nuclear factor of activated T-cells, cytoplasmic 2/NFATC2	-Cell nuclear factor of activated T-cells, 60 cytoplasmic 3/NFATC3	nuclear factor of activated T-cells, 60 cytoplasmic 4/NFATC4	interleukin 2 receptor alpha/IL2RA 14		na/IL2RG		interleukin 9 receptor/IL9R 30	interleukin receptor 13 alpha/IL13RA1 30	interleukin receptor 13 alpha2/IL13RA 30	interleukin 15 receptor alpha/IL15RA 60			transforming growth factor/TGFB3   190

Immune
Response
(additional
genes in
Immunology)

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	tumor necrosis factor ligand superfamily, member 6/TNFSF6	134638	6 89000 MN	1923
	tunnor necrosis factor receptor superfamily, member 6/TNFRSF6	134637	NM_00004 3	10q24.1
	caspase 10, apoptosis-related cysteine protease/CASP10	601762	601762 NM_00123	2q33-q34
	B-cell antigen CD20/B-lymphocyte differentiation antigen B1/CD20	112210	112210 AH003353	11913
	B-cell antigen CD72/CD72	107272	NM_00178 2	g6
	macrophage protein  1/NRAMP1/solute carrier family 11,	600266	600266 AH002806	2q35
	macrophage protein  2/NRAMP2/solute carrier family 11,	600523	AB015355	12q13
	T-lymphocyte antigen CDW52 (CAMPATH-1 antigen)/CDW52	114280	NM_00180	* * *
	B-cell antigen CD22/CD22	107266	NM_00177	19q13.1
	D-cell alligen CD24/CD02 Iiaaad/CD34	600074	X69397	6q21
Receptors	leukocyte antigen CD156/disintegrin and metalloprotease domain 8/ADAM8/CD156	602267	NM_00110	10q26.3
	platelet antigen CD151/platelet- endothelial cell tetraspan antigen 3/PETA3/CD151	602243	NM_00435	11p15.5

	11 A Com The Comment of			
	LIA 101 FC ITABILIENT OF		NM_00400	
	IgG/FCGR2A/CD32	146790	1	1q21-q23
	activated leucocyte cell adhesion molecule/CD6 ligand/ALCAM	601662	NM_00162	3q13.1- q13.2
	lymphocyte antigen CD79A/immunoglobulin-associated		NM 00178	
	alpha/CD79A	112205	<sub>.</sub> د	19q13.2
	lymphocyte antigen CD79B/immunoglobulin-associated			
	beta/CD79B	147245	L27587	17q23
Signalling	regulator of G-protein signalling 1/RGS1	600323	NM_00292 2	1431
· ·	immunoglobulin K light chain constant region locus/IGKC	147200	***	2p12
	immunoglobulin K light chain variable region locus/IGKV	146980	K01322	2p12
Immunoglob	immunoglobulin K light chain joining region locus/IGKJ	146970	* * * *	2p12
Chains	immunoglobulin L light chain constant region locus/IGLC1	147220	NM_00614 6	22q11.2
	immunoglobulin L light chainjoining region locus/IGLJ	147230	NM_00614 6	22q11.2
	immunoglobulin L light chain variable region locus/IGLJ	147240	NM_00614 6	22q11.2
	immunoglobulin A heavy chain constant region locus 1/IGHA1	146900	* * * * *	14q32.33
	immunoglobulin A heavy chain constant region locus 2/IGHA2	147000	**	14q32.33

	immunoglobulin D heavy chain	, i		
	constant region locus/IGHD	14/1/0	*	14q32.33
	imnunoglobulin E heavy chain constant region locus/IGHE	147180	**	14q32.33
	immunoglobulin G heavy chain constant region locus 1/IGHG1	147100	**	14q32.33
	immunoglobulin G heavy chain constant region locus 2/IGHG2	147110	* * *	14q32.33
Immunoglob	immunoglobulin G heavy chain constant region locus 3/IGHG3	147120	* * *	14q32.33
Chains	immunoglobulin G heavy chain constant region locus 4/IGHG4	147130	**	14q32.33
	immunoglobulin M heavy chain constant region locus/IGHM	147020	***	14q32.33
	immunoglobulin heavy chain variable region locus 1/IGHV1	147070	X92279	14q32.33
	immunoglobulin heavy chain variable region locus 2/IGHV2	600949	***	16p11
	immunoglobulin heavy chain diversity region locus 1/IGHDY1	146910	X97051	14q32.33
	immunoglobulin heavy chain diversity region locus 2/IGHDY2	146990	L25544	15q11-q12
	immunoglobulin heavy chain joining region locus/IGHJ	147010	***	14q32.33
	recombination activating gene 1/RAG1	179615	NM_00044 8	11p13.
	A A A A A A A A A A A A A A A A A A A	179616	M94633	11p13

		immunoglobulin kappa J region recombination signal binding protein/RBPJK/IGKJRB1	147183	L07872	9p13-p12
		Bruton agammaglobulinemia tyrosine kinase/BTK	300300	NM_00006 1	Xq21.3-q22
		interleukin 7 receptor/IL/R	146661	NM_00218 5	5p13
	Immunooloh	interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6923-924
B-Cell Response	ulin Gene Rearrangem	interferon-gamma receptor 2/IFNGR2	147569	NM_00553 4	21q22.1- q22.2
	ent	interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
		interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
		ligase I, DNA, ATP-dependent/LIG1	126391	NM_00023 4	19q13.2- q13.3
		ligase IV, DNA, ATP-dependent/LIG4 601837	601837	NM_00231 2	13q22-q34
		X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
		kD/KU80/XRCC5	194364	***	2q35
		thyroid autoantigen, 70 kD/KU70/G22P1	152690	NM_00146 9	22q11-q13
		nuclear factor kappa-B DNA binding subunit 1/NFKB1	164011	M58603	4q23-q24
		nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250 2	10q24

	nuclear factor kappa-B subunit 3/NFKB3	164014	Z22949	11q12-q13
	nuclear factor of kappa light chain gene enhancer in B cells, inhibitor alpha/NFKBIA	164008	**	14913
	nuclear factor of kappa light chain gene enhancer in B cells, inhibitor beta/NFKBIB	603258	NM_00250	8p11.2
	YY1 transcription factor/YY1	600013	NM_00340 3	14q
Immunoglob ulin Gene	Immunoglob immunoglobulin transcription factor ulin Gene 1/ITF1/transcription factor 3/TCF3	147141	***	19p13.3
Transcriptio n	immunoglobulin transcription factor 2/ITF2/transcription factor 4/TCF4	602272	NM_00319 9	18q21.1
	immunoglobulin mu binding protein 2/IGHMBP2	600502	NM_00218 0	11q13.2- q13.4
	transcription factor binding to IGHM enhancer 3/TFE3	314310	NM_00652 1	Xp11.22
	homeobox protein OCT1/POU domain transcription factor 2, class 1/POU2F1	164175	NM_00269 7	1q22-q23
	homeobox protein OCT2/POU domain transcription factor 2, class 2/POU2F2	164176	M22596	Chr.19
	POU domain, class 2, associating factor 1/POU2AF1	601206	NM_00623 5	11q23.1
	inhibitor of DNA binding 1, dominant negative helix-loop-helix protein/ID1	600349	NM_00216 5	20q11,
	inhibitor of DNA binding 2, dominant negative helix-loop-helix protein/ID2	600386	NM_00216 6	2p25

	B-cell antigen CD40/tumor necrosis			
	factor receptor superfamily, member	·	NM_00125	20q12-
	5/CD40/TNFRSF5	109535		q13.2
	paired box gene 5/B-cell lineage-			
	specific activator protein/BSAP/PAX5	167414	****	9p13
	lymphocye function-associated		NM 00177	
	antigen, type 3/LFA3/LEU7/CD58	153420	6	1p13
	interleukin 10 receptor, alpha/IL10RA	146933	NM_00155 8	11q23.3
	lymphocyte antigen CD45/protein			
	tyrosine phosphatase, receptor type, c	161460	MK.	
	perpendent if NC/CD45	151400	8	1931-932
•	prostaglandin E receptor 1, EP1			
	subtype/PTGER1	176802	176802 NM_000955	19p13.1
	prostaglandin E receptor 2, EP2			
	subtype/PTGER2	176804	****	5p13.1
	prostaglandin E receptor 3, EP3			
	subtype/PTGER3	176806	176806 NM_000957	1p31.2
mminoaloh	prostaglandin E receptor 4, EP4			
ulin Isotyne	subtype/PTGER4	601586	601586 NM_000958	5p13.1
Switching	interleukin 13 receptor, alpha 1/IL13RA1	300119	NM_00156 0	Chr.X
	interleukin receptor 13 alpha2/IL13A2	300130	X95302	Xq24
	interferon-gamma receptor 1/FNGR1	107470	NM_00041 6	6q23-q24
	interferon-gamma receptor 2/IFNGR2	147569	NM_00553 4	21q22.1- q22.2
-	interleukin 5 receptor alpha/IL5RA	147851	M96652	3p26-p24:

trans recep like l	transforming growth factor, beta receptor I (activin A receptor type II- like kinase, 53kD)/TGFBR1	190181	NM_00461	9q33-q34
trans	transforming growth factor, beta receptor II (70-80kD)/TGFBR2	190182	NM_00324 2	3p22
recep	receptor III (betaglycan,	600742	NM_00324 3	1p33-p32
X-ray Chin	X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
KD/K	kD/KU80/XRCC5	194364	***	2q35
thyro	thyroid autoantigen, 70		NM_00146	
X/UX	KU/KU/0/G22P1	152690	6	22q11-q13
granu stimu	granulocyte-macrophage colony stimulating factor 2/CSF2	138960	NM_00075 8	5q31.1
macre	macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
granuloc 3/CSF3	granulocyte colony stimulating factor 3/CSF3	138970	NM_00075	17q11.2- q12
colon	colony stimulating factor 1 receptor/CSFR1	164770	U63963	5q33.2- q33.3
granu stimu low-a	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA	306250	NM_00614 0	Xp22.32
granu stimul beta/C	granulocyte-macrophage colony stimulating factor 2 receptor, beta/CSF2RB	138981	U18373	22q12.2- q13.1
granul stimul chrom	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y chromasomal/CSF2RY	425000	* * * *	Yp11
7.				

		fit3 ligand/FMS-related tyrosine		L	
	Granulocyte,	Granulocyte, kinase 3 ligand/FLT3LG	600007	U03858	19q13.3
Myeloid Differentiati	Macrophage, ST Erythrocyte, 3	Macrophage, STAT induced STAT inhibitor 3/SSI-Erythrocyte, 3	SSI- 604176	NM_00395 5	**
on on	and Platelet Differentiati	erythropoietin/EPO	133170	00079 9	7q21
	uo	erythropoietin receptor/EPOR	133171	NM_00012 1	19p13.3- p13.2
<u> </u>		Janus kinase 2 (a protein tyrosine kinase)/JAK2	147796	NM_00497	9p24
		STAM-like protein containing SH3 and ITAM domains 2/STAM2	* * * * *	NM_00584 3	***
		ribosomal protein S7/RPS7	603474	NM_00101 1	19913.2
-		signal transducer and activator of transcription 5A/STAT5A	601511	601511 NM_00315	17q11.2
		BCL-X/BCLX	600039	Z23115	***
		thrombopoietin (MLV oncogene ligand, megakaryocyte growth and development factor)/THPO		600044 NM_00046	3q26.3-q27
		myeloproliferative leukemia virus oncogene/MPL/thrombopoietin receptor/TPOR	159530	159530 NM_00537	1p34
	·	FMS-related tyrosine kinase 3/FLT3	136351	NM_00411 9	13q12

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Table 4. Inflammation Gene List	Function Name
	Pathway

		MHC class I HLA A/HLA-A	142800	AF148863	6p21.3
		MHC class I HLA B/HLA-B	142830	NM_00551 4	6p21.3
1	Major	MHC class I HLA C'HLA-C	142840	AF168611	6p21.3
H	Histocompat ibility	MHC class I HLA E/HLA-E	143010	NM_00551 6	6p21.3
<u> </u>	Complex I	MHC class I HLA F/HLA-F	143110	X17093	6p21.3
		MHC class I HLA G/HLA-G	142871	AH005893	6p21.3
		beta-2-microglobulin/B2M	109700	NM_00404 8	15q21-q22
	Major		188370	AF142665	1q21-q23
His	Histocompat		188360	AF142666	1q21-q23
	ibility	thymocyte antigen CD1C/CD1C	188340	AF142667	1q21-q23
ວັ'	Complex I-	thymocyte antigen CD1D/CD1D	188410	AF142668	1q21-q23
	Related	thymocyte antigen CD1E/CD1E	188411	AF142669	1q21-q23
		interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6q23-q24
		interferon-gamma receptor 2/IFNGR2 147569	147569	NM_00553	21q22.1- q22.2
MH Tra	IC Class I	MHC Class I TATA box binding protein (TBP)- Transcriptio associated factor, RNA polymerase II,		NM 00460	
	п	A, 250kD/TAF2A	313650	9	Xq13
			147575	NM_00219 8	5q31.1
		nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250	10q24
	<u>_</u>	MHC class II HLA DR-alpha			
		chain/HLA-DRA	142860	X83114	6p21.3

	MHC class II HLA DR-beta chain/HLA-DRB	142857	M11161	6p21.3
	MHC class II HLA DP-alpha chain/HLA-DPA	142880	M23905	6p21.3
	MHC class II HLA DP-beta chain/HLA-DPB	142858	AH002893	6p21.3
	MHC class II HLA DM-alpha chain/HLA-DMA	142855	NM_00612 0	6p21.3
Major	MHC class II HLA DM-beta chain/HLA-DMB	142856	NM_00211 8	6p21.3
Histocompat ibility	Histocompat MHC class II HLA DQ-alpha ibility chain/HLA-DQA	146880	M11124	6p21.3
Complex II	MHC class II HLA DQ-beta chain/HI,A-DQB	* * * * *	M24364	6p21.3
	MHC class II HLA DN-alpha chain/HLA-DNA	142930	X02882	6p21.3
	MHC class II HLA DO-beta chain/HLA-DOB	600629	NM_00212 0	6p21.3
	MHC class II antigen gamma chain/CD74	142790	K01144	5q32
	antigen peptide transporter 1/MHC 1/TAP1	170260	NM_00059	6p21.3
	antigen peptide transporter 2/MHC 2/TAP2	170261	NM_00054 4	6p21.3
	interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6q23-q24
	interferon-gamma receptor 2/IFNGR2	147569	NM_00553 4	21q22.1- q22.2
	regulatory factor X, 5 (influences HLA class II expression)/RFX5	601863	NM_00044 9	1q21.1- q21.3

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16p13	13q14	19p12	19p13.3- p13.2	* * *	6p21.3	12q22-q23	14q11.2	7q35	7p15-p14	14q11.2	11923	11923
NM_00024 6	NM_00053 8	NM_00372	****	NM_00250 4	NM_00250 5	NM_00616 6	Z24457	AF011643	M17325	L36384	NM_00007	NM_00073 2
600005	601861	603200	142765	603255	189903	189904	186880	186930	186970	186810	186740	186790
MHC class II transactivator/MHC2TA 600005 NM_00024	MHC Class regulatory factor X-associated II protein/RFXAP	Transcriptio regulatory factor X-associated ankyrin-n containing protein/RFXANK	regulatory factor X, 2 (influences HLA class II expression)/RFX2	nuclear transcription factor, X-box binding I/NFX1	nuclear transcription factor Y, alpha/NFXA	nuclear transcription factor Y, beta/NFYB	T-cell antigen receptor, alpha subunit/TCRA	T-cell antigen receptor, beta subunit/TCRB	T-cell antigen receptor, gamma subunit/TCRG	T-cell antigen receptor, delta subunit/TCRD	thymocyte antigen receptor complex CD3G, gamma polypeptide (TiT3 complex)/CD3G	thymocyte antigen receptor complex CD3D, delta polypeptide (TiT3 complex)/CD3D
	MHC Clas	Transcript n									T-Cell Antigen	Receptor
				Antigen Presentation	and Recognition	·						
			mmillo	Discriminati	(Self vs Non-							

	thymocyte antigen receptor complex CD3E, epsilon polypeptide (TiT3 complex)/CD3E	186830	186830 NM_00073	11923
	thymocyte antigen receptor complex CD3Z, zeta polypeptide (TiT3 complex)/CD3Z	186780	NM_00073	1922-923
1	(p50), sheep red blood cell receptor/CD2	186990	NM_00176 7	1p13.1
	ataxia telangiectasia mutated (includes			
	complementation groups A, C and	000000	NM_00005	11.000
	D//AIM	706907	1	11922.3
	recombination activating gene 1/RAG1	179615	NM_00044 8	11p13
	ordinomation activating gene	179616	M94633	11p13
	interleukin 7 receptor/IL7R	146661	NM_00218 5	5p13
	v-myb avian myeloblastosis viral		NM_00537	
Rearrangem	oncogene homolog/MYB	189990	5	6q22
ent of T-Cell				
Antigen	subunit/CBFA1	600211	AH005498	6p21
Receptor	core-binding factor, beta			
Complex	subunit/PEBP2B/CBFB	121360	L20298	16q22
	ligase I, DNA, ATP-dependent/LIG1	126391	NM_00023 4	19q13.2- q13.3
	ligase IV, DNA, ATP-dependent/LIG4	601837	NM_00231	13q22-q34
	X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
	kD/KU80/XRCC5	194364	****	2q35
	2.00 2.00 2.00 2.00 2.00 2.00 2.00 2.00			

'						
			thyroid autoantigen, 70 kD/KU70/G22P1	152690	NM_00146 9	22q11-q13
			GATA-binding protein 3/GATA3	131320	NM_00205 1	10p15
			long form transcription factor C-MAF/CMAF	* * *	AF055377	****
	-	Transcription of T-Cell	Transcriptio B-cell antigen CD25/interleukin 2 n of T-Cell receptor, alpha chain/IL2RA/CD25	147730	10p15-p14	10p15-p14
		Antigen Receptor	interleukin 2 receptor, beta/IL2RB	146710	NM_00087 8	22q11.2- q13
		Complex	interleukin 2 receptor, gamma chain/IL2RG	308380	NM_00020 6	
			transcription factor 1/hepatic nuclear factor /HNF1/albumin proximal factor/TCF1	142410	NM_00054	12q24.2
		B-Cell Antigen	lymphocyte antigen CD79A/immunoglobulin-associated alpha/CD79A	112205	NM_00178	19q13.2
		Receptor Complex	lymphocyte antigen CD79B/immunoglobulin-associated beta/CD79B	147245	L27587	17q23
			interferon regulatory factor 1/IRF1	147575	NM_00219 8	5q31.1
			interferon regulatory factor 2/IRF2	147576	NM_00219 9	4q35.1
			interferon consensus sequence binding protein 1/ICSBP1	601565	NM_00216	**
		٠	interferon alpha 1/IFNA1	147660	X02956	9p22
			interferon alpha 2/IFNA2	147562	Y11834	9p22

	-	interferon alpha 4/IFNA4	147564	****	9n22
		interferon alpha 5/IFNA5	147565	NM_00216 9	9p22
		interferon alpha 6/IFNA6	147566	***	9p22
		interferon alpha 7/IFNA7	147567	***	9p22
		interferon alpha 8/IFNA8	147568	NM_00217 0	
	Synthesis	interferon alpha 10/IFNA10	147577	NM_00217 1	9p22
		interferon alpha 13/IFNA13	147578	06900 MN	9p22
terferons		interferon alpha 14/IFNA14	147579	NM_00217 2	9p22
<del></del>		interferon alpha 16/IFNA16	147580	.NM_00217 3	9p22
		interferon alpha 17/IFNA17	147583	****	9p22
		interferon alpha 21/IFNA21	147584	NM_00217 5	9p22
		interferon beta 1/IFNB1	147640	NM_00217 6	9p21
		interferon beta 3/IFNB3	147860	K03196	Chr.8
		interferon gamma/IFNG	147570	L07633	12q14
		interferon omega 1/IFNW1	147553	NM_00217 7	9p21
		interferon (alpha, beta and omega) receptor 1/IFNAR1	107450	X77722	21q22.1
	Recentors	interferon (alpha, beta and omega) receptor 2/IFNAR2	602376	NM_00087 4	21q22.1
		interferon-gamma receptor 1/IFNGR1 107470 NM_00041 6	107470	NM_00041 6	6923-924

	interferon-gamma receptor 2/IFNGR2 147569	R2 147569	NM_00553	21q22.1-
			4	q22.2
	interleukin enhancer binding factor 1/ILF1	147685	NM_00451	17q25
	interleukin enhancer binding factor 2, 45 kD/ILF2	2, 603181	NM_00451 5	**
	interleukin enhancer binding factor 3, 90 kD/ILF3	3, 603182	NM_00451 6	**
	interleukin 1 alpha/IL1A2	147761	M15330	3q14
	interleukin 1 beta/IL1B	147720	AF043335	2q14
	apoptosis-related cystein protease 1/interleukin 1-beta converting	147678	NM_00122	-
	enzyme/ICE/caspase 1/CASP1		7)	q22.3
	interleukin 2/IL2	147680	X01586	4q26-q27
	interleukin 3/IL3	147740	NM_00058 8	5q31.1
	interleukin 4/ILA	147780	NM_00058 9	5q31.1
	interleukin 5/IL5	147850	NM_00087 9	5q31.1
	interleukin 6/IL6	147620	AF048692	7p21
Synthesis	interleukin 7/1L7	146660	NM_00088 0	8q12-q13
	interleukin 8/IL8	146930	M26383	4q12-q13
	interleukin 9/IL9	146931	X17543	5q31.1
	interleukin 10/IL10	124092	M57627	1q31-q32
	interleukin 11 beta/IL11B	147681	147681 NM_00088	19q13.3-
		_	_	7 7 7

	_				
		interleukin 12A (natural killer cell stimulatory factor 1, cytotoxic lymphocyte maturation factor 1, p35)/IL12A	161560	161560 NM_00218	3p12-q13.2
		interleukin 12B/IL12B	161561	NM_00044 0	5q31.1- q33.1
		interjeukin 13/IL13	147683	NM_00218 8	5q31
		interleukin 15/IL15	600554	U14407	4q31
		interleukin 16/IL16	603035	NM_00451 3	* * *
		lymphocyte-associated serine esterase	603149	NM_00219 0	2q31
:		interleukin 18 (interferon-gamma- inducing factor)/L.18	600953	NM_00156	11q22.2- q22.3
eukins	······································	interleukin 1 receptor, type I/IL1R1	147810	NM_00087	2412
		interleukin 1 receptor, type 2/IL1R2	147811	NM_00463 3	2q12-q22
<u>-</u>		interleukin 1 receptor-like 2/IL1RL2	****	NM_00385 4	* * *
		interleukin 1 receptor accessory protein/1L1RAP	602626	NM_00218 2	3928
		B-cell antigen CD25/interleukin 2 receptor, alpha chain/IL2RA/CD25	147730	10p15-p14	10p15-p14
		interleukin 2 receptor, beta/IL2RB	146710	NM_00087 8	22q11.2- q13
		interleukin 2 receptor, gamma chain/IL2RG	308380	NM_00020 6	Xq13
		interleukin 3 alpha receptor/IL3RA	308385	M74782	Xp22.3

_			1 0000 J. W.	- 1
	interleukin 4 receptor precursor/IL4R	147781	8	10p12.1- p11.2
	interleukin 5 receptor alpha/IL5RA	147851	M96652	3p26-p24:
	interleukin 6 receptor/ILGR	147880	NM_00056 5	1
Receptors	interleukin 7 receptor/IL7R	146661	NM_00218 5	5p13
	interleukin 9 receptor/IL9R	300007	300007 NM_00218 6	Xq28
	interleukin 10 receptor, alpha/IL10RA	146933	NM_00155 8	11q23.3
	interleukin 10 receptor beta/IL10RB	* * * * *	NM_00062 8	***
	interleukin receptor 11 alpha/IL11RA	686009	NM_00451	9p13
	interleukin 12 receptor, beta 1/IL12RB1	600939	NM_00553	9p13
	interleukin 12 receptor, beta 2/IL12RB2	601642	NM_00155 9	1p31.2
	interleukin 13 receptor, alpha 1/IL13RA1	300119	NM_00156 0	Chr.X
	interleukin receptor 13 alpha2/IL13A2	300130	X95302	Xq24
	interleukin 15 receptor, alpha/IL15RA	601070	NM_00218 9	10p15-p14
	interleukin 18 receptor 1/IL18R1	* * * *	NM_00385 5	* * * *
	interleukin 18 receptor accessory protein/IL18RAP	* * * *	NM_00385	****
	LPS-Induced TNF-Alpha Factor/LITAF	603795	U77396	16p13.3- p12

	tumor necrosis factor alpha/TNFA	191160	X01394	6p21.3
	tumor necrosis factor		MN	
	beta/TNFB/lymphotoxin alpha/LTA	153440	5	6p21.3
	tumor necrosis factor		NM_00234	
	C/TNFC/lymphotoxin-beta/LTB	600978	_	6p21.3
	tumor necrosis factor ligand		NM_00332	
	superfamily, member 4/TNFSF4	603594	9	1925
	tumor necrosis factor ligand		NM_00007	
	superfamily, member 5/TNFSF5	308230	4	Xq26
	tumor necrosis factor ligand	134638	NM_00063	1,072
	superfamily, member 6/TNFSF6	200	6	C7h1
Synthesis	B-cell antigen CD70/tumor necrosis			
	factor ligand superfamily, member		NM_00125	
	7/TNFSF7/CD27 ligand/CD70	602840	2	19p13
	tumor necrosis factor ligand		NM_00124	
	superfamily, member 8/TNFSF8	603875		9q33
	tumor necrosis factor ligand		NM_00381	
	superfamily, member 10/TNFSF10	603598	0	3q26
	tumor necrosis factor ligand		NM_00370	
	superfamily, member 11/TNFSF11	602642	-	13q14
	tumor necrosis factor ligand		NM_00380	
	superfamily, member 12/TNFSF12	602695	6	17p13.3
	tumor necrosis factor ligand		NM_00657	
	superfamily, member 13B/TNFSF13B	603969	3	13q32-q34
	tumor necrosis factor ligand			
	superfamily, member 15/TNFSF15	604052	****	9433
	tumor necrosis factor receptor	191190	NM_00106	12p13.2
	Superiority, member 170 HAFROFIA		0	•
	tumor necrosis factor receptor superfamily member 1B/TNFRSF1B	191191	NM_00106	1p36.3-
				2.000

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Tumor Necrosis Factor Ligand Superfamily

tume supe B-ce facto	TOTAL STREET,		7	
B-ce facto	tumor necrosis factor receptor superfamily, member 4/TNFRSF4	600315	NM_00332	1p36
うら	B-cell antigen CD40/tumor necrosis factor receptor superfamily, member 5/CD40/TNFRSF5	109535	NM_00125	20q12-
lymp necr mem	lymphocyte antigen CD95/tumor necrosis factor receptor superfamily, member 6/TNFRSF6/CD95	134637	NM_00004	10q24.1
tumo	tumor necrosis factor receptor superfamily, member 6B/TNFRSF6B	603361	NM_00382 3	20q13
T-cel facto 7/CD	T-cell antigen CD27tumor necrosis factor receptor superfamily, member 7/CD27/TNFRSF7	186711	M63928	12p13
lymp	ymphocyte antigen CD30/tumor			
mem	necrosis factor receptor superfamily, member 8/CD30/TNFRSF8	153243	NM_00124 3	1p36
Receptors super	tumor necrosis factor receptor superfamily, member 9/TNFRSF9	602250	NM_00156 1	1p36
super	superfamily, member	603611	NM_00384 4	8p21
super	superfamily, member	603612	NM_00384 2	8p22-p21
super	superfamily, member	603613	AF014794	8p22-p21
super	superfamily, member	603614	NM_00384 0	8p21
super	superfamily, member	603499	NM_00383 9	18922.1

		tuilioi licciosis jactor receptor			
		superfamily, member	602643	NM_00254	8q24
		tumor necrosis factor recentor		NTM 00370	
		superfamily, member 12/TNFRSF12	603366	0	1p36.3
		tumor necrosis factor receptor	7,1007	NM 00382	1p36.3-
		superfamily, member 14/TNFRSF14	002/40		p36.2
		tumor necrosis factor receptor	1/2010	NM 00250	
		superfamily, member 16/TNFRSF16	102010		17921-922
		tumor necrosis factor receptor	100545	130112	:
		superfamily, member 17/TNFRSF17	109345	714954	16p13.1
		tumor necrosis factor receptor	20000	4 4 4	
		superfamily, member 18/TNFRSF18	coksno	*	1p36.3
		transforming growth factor,	190170	190170 NM 003236	2p13
		transforming growth factor, beta-			
		1/TGFB1	190180	M60315	9q13.1-q13.3
	Synthesis	transforming growth factor, beta-			
		2/TGFB2	190220	190220 NM_003238	1q41
		transforming growth factor, beta-			
Transformin		3/TGFB3	190230	190230 NM_003239	14q24
g Growth		growth differentiation factor 1/GDF1	602880	602880 NM_001492	19p12
Factor		transforming growth factor, beta		TAK OOK	
		receptor I (activin A receptor type II-	190181	NM_00461	9q33-q34
		like kinase, 53kD)/TGFBR1		7	
	Receptors	transforming growth factor, beta		NM 00324	
		receptor II (70-30kD)/TGFBR2	190182	, 7	3p22
		recentor III (hottor)	07 2000	NM 00324	
		2001/TCTT Cociagnycall,	000/47	١٣	1p33-p32

q12			chemotactic protein 3/MCP3/SCYA7
17q11.2-	AF043338	158106	(Cys-Cys), menber 7/monocyte
* + + + + + + + + + + + + + + + + + + +			(Cys-Cys), member 6/SCYA6
1 1 1 1 1	***************************************	*****	small inducible cytokine subfamily A
<b>d</b> 12	^		protein p228/TCP228/SCYA5
-7.11p/1	MM	187011	(Cys-Cys), member 5/T-cell specific
0	00000 FEX		small inducible cytokine subfamily A
			1B/MIP1B/SCYA4L
1/q11.2	X32149	78/cna	inflammatory protein
t	VEDITO	602707	(Cys-Cys), member 4-like/macrophage
			small inducible cytokine subfamily A
			1B/MIP1B/SCYA4
1/q21-q23	4	102204	inflammatory protein
	NM_00298	10000	(Cys-Cys), member 4/macrophage
			small inducible cytokine subfamily A
-			beta/SCYA3L1
17q11.2	D90144	601395	(Cys-Cys), member 3-like 1/LD78-
			small inducible cytokine subfamily A
			1A/MIP1A/SCYA3
1/q11-q21	۱۳	182283	inflammatory protein
	NM 00298	10000	(Cys-Cys), member 3/macrophage
			small inducible cytokine subfamily A
d12	7		chemotactic protein 1/MCP1/SCYA2
17	158105 NM_00298	158105	(Cys-Cys), member 2/monocyte
	30000		small inducible cytokine subfamily A
			cytokine 1309/SCYA1
Chr.17	NM_00298	182281	(Cys-Cys), member 1/ inflammatory
	20000 7 11		small inducible cytokine subfamily A
		The state of the s	

		( ) to ( )	
	602283	NM_00562   3	17q11.2
chemotactic protein 2/MCP2/SCYA8		,	
small inducible cytokine subfamily A			
	****	****	****
9/10//SCYA9SCY10			
small inducible cytokine subfamily A		00000	
	601156	NM_00298	17q21.1-
11/eotaxin/SCYA11		9	q21.2
small inducible cytokine subfamily A	***************************************	***************************************	4 4 4 4
(Cys-Cys), member 12/SCYA12		+ + + + +	*
small inducible cytokine subfamily A		07300 744	
	601391	INIM_00540	17q11.2
chemotactic protein 4/MCP4/SCYA13		×	•
small inducible cytokine subfamily A		00000	
	601392	NIM_00459	17q11.2
chemokine 2/NCC2/SCYA14		>	1
small inducible cytokine subfamily A		71700 741	
(Cys-Cys), member 15/leukotactin	601393	NIM 00416	17q11.2
		_	-
small inducible cytokine subfamily A		03700 747	
(Cys-Cys), member 16/new cc 6	601394	NIM_00459	17q11.2
chemokine 4/NCC4/SCYA16		>	•
small inducible cytokine subfamily A			
(Cys-Cys), member 17/thymus and	00310	NM 00298	,
activation-regulated	025100		16413
chemokine/TARC/SCYA17	•		

(Cys-Cys), member 18/pulmonary and activation-regulated chemokine/PAC/SCYA18  small inducible cytokine subfamily A (Cys-Cys), member 19/macrophage inflammatory protein  3B/MIP3B/SCYA19  small inducible cytokine subfamily A (Cys-Cys), member 20/macrophage adily inducible cytokine subfamily A (Cys-Cys), member 21/secondary protein subfamily A (Cys-Cys), member 21/secondary protein small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor  (Cys-Cys), member 23/myeloid progenitor inhibitory factor I/MPIP1/SCYA23  small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor I/MPIP1/SCYA24  small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor I/MPIP1/SCYA24  small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor I/MPIP2/SCYA24  small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-		small indivoible outoline and family			
activation-regulated chemokine/PARC/SCYA18 small inducible cytokine subfamily A (Cys-Cys), member 19/macrophage inflammatory protein 3B/MIP3B/SCYA19 small inducible cytokine subfamily A (Cys-Cys), member 20/macrophage inflammatory protein 3A/MIP3A/exodus 1/SCYA20 small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF1/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- expressed chemokine/TECK/SCYA25		(Cys-Cys), member 18/pulmonary and			
chemokine/PARC/SCYA18  small inducible cytokine subfamily A (Cys-Cys), member 19/macrophage inflammatory protein 3B/MIP3B/SCYA19  small inducible cytokine subfamily A (Cys-Cys), member 20/macrophage inflammatory protein 3A/MIP3A/exodus 1/SCYA20 small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF1/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF1/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- expressed chemokine/TECK/SCYA25		activation-regulated	603757		17q11.2
small inducible cytokine subfamily A  (Cys-Cys), member 19/macrophage inflammatory protein 3B/MIP3B/SCYA19 small inducible cytokine subfamily A (Cys-Cys), member 20/macrophage inflammatory protein 3A/MIP3A/exodus 1/SCYA20 small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- expressed chemokine/TECK/SCYA25		chemokine/PARC/SCYA18			
(Cys-Cys), member 19/macrophage inflammatory protein  3B/MIP3B/SCYA19  small inducible cytokine subfamily A (Cys-Cys), member 20/macrophage inflammatory protein  3A/MIP3A/exodus 1/SCYA20  small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21  small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22  small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid forse-cys), member 23/myeloid cys-Cys), member 24/myeloid forse-cys), member 25/myeloid forse-cys), member 25/m		small inducible cytokine subfamily A			
inflammatory protein  3B/MIP3B/SCYA19  small inducible cytokine subfamily A  (Cys-Cys), member 20/macrophage inflammatory protein  3A/MIP3A/exodus 1/SCYA20  small inducible cytokine subfamily A  (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21  small inducible cytokine subfamily A  (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23  small inducible cytokine subfamily A  (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF1/SCYA24  small inducible cytokine subfamily A  (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF1/SCYA24  small inducible cytokine subfamily A  (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24  small inducible cytokine subfamily A  (Cys-Cys), member 25/thymus- expressed chemokine/TECK/SCYA25		(Cys-Cys), member 19/macrophage	10000	NM 00627	
small inducible cytokine subfamily A  (Cys-Cys), member 20/macrophage inflammatory protein 3A/MIP3A/exodus 1/SCYA20 small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- cypressed chemokine/TECK/SCYA25 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-		inflammatory protein	/77700	1 4	
small inducible cytokine subfamily A  (Cys-Cys), member 20/macrophage inflammatory protein 3A/MIP3A/exodus 1/SCYA20 small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-		3B/MIP3B/SCYA19			
(Cys-Cys), member 20/macrophage inflammatory protein  3A/MIP3A/exodus 1/SCYA20 small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 1/MPIF1/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-	thesis	small inducible cytokine subfamily A			
inflammatory protein  3A/MIP3A/exodus 1/SCYA20  small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24  small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24  small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- expressed chemokine/TECK/SCYA25  small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-	o deo	(Cys-Cys), member 20/macrophage	0,010,	NM 00459	
small inducible cytokine subfamily A  (Cys-Cys), member 21/secondary Iymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-	ling and		006100	,	/£b-££b7
small inducible cytokine subfamily A  (Cys-Cys), member 21/secondary Iymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-	ring and				
(Cys-Cys), member 21/secondary 602737 NM_00298 lymphoid tissue chemokine/SLC/exodus 2/SCYA21 Small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 Small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- 602565 NM_00562 expressed chemokine/TECK/SCYA25	tors	small inducible cytokine subfamily A			
lymphoid tissue chemokine/SLC/exodus 2/SCYA21 small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22 small inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23 small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCYA24 small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- small inducible cytokine subfamily A (Cys-Cys), member 25/thymus- expressed chemokine/TECK/SCYA25	(wo)	(Cys-Cys), meniber 21/secondary	1000	NM 00298	,
602957 NM_00299 602494 NM_00506 602495 NM_00299 602565 NM_00562	`	lymphoid tissue	002/3/	, 6	9p13
602957 NM_00299 602494 NM_00506 602495 NM_00299 602565 NM_00562		chemokine/SLC/exodus 2/SCYA21			
602494 NM_00506 602495 NM_00299 602565 NM_00562		small inducible cytokine subfamily A	230003	NM_00299	
602494 NM_00506 602495 NM_00299 602565 NM_00562	-	(Cys-Cys), member 22/SCYA22	166700	0	10913
602494 NM_00506 602495 NM_00299 602565 NM_00562		small inducible cytokine subfamily A			
602495 NM_00299 602565 NM_00562		(Cys-Cys), member 23/myeloid	70703	NM_00506	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
602495 NM_00299 602565 NM_00562		progenitor inhibitory factor	002494	4	*
602495 NM_00299  602565 NM_00562		1/MPIF1/SCYA23			
602495 NM_00299 602565 NM_00562		1			
602565 NM_00562			30700	NM 00299	;
602565 NM_00562 4			002493	,	/q11.23
602565 NM_00562		2/MPIF2/SCYA24			
602565 NIM_00362		small inducible cytokine subfamily A		000000	
4		(Cys-Cys), member 25/thymus-	602565	1000 MINI	19p13.2
		expressed chemokine/TECK/SCYA25		4	•

Cytokine-Mediated Immune Regulation

small inducible cytokine subfamily A			
(Cys-Cys), member 26/eotaxin 3/SCY A26	* * * *	AA716120	Chr. 7
small inducible cytokine subfamily A (Cys-Cys), member 27/ALP/SCYA27	* * * *	* * *	Chr. 9
(Cys-X-Cys), member	155730	NM_00151	4q12-q13
(Cys-X-Cys), member	139110	NM_00208 9	4q12-q13
(Cys-X-Cys), member	139111	AA935273	4q12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 4/SCYB4/platelet factor 4/PF4	173460	NM_00261	4q12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 5/epithelial-derived neutrophil-activating peptide 78/SCYB5	600324	NM_00299 4	4q13-q21
small inducible cytokine subfamily B (Cys-X-Cys), member 6/granulocyte chemotactic protein 2/GCP2/SCYB6	138965	U83303	4q12-q21
small inducible cytokine subfamily B (Cys-X-Cys), member 7/SCYB7	121010	NM_00270 4	4p12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 8/SCYB8/interleukin 8/IL8	146930	M26383	4q12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 9/SCYB9	601704	AA037522	4q21

small inducible cytokine subfamily B			
(Cys-X-Cys), member 10/SCYB10interferon (gamma)-	147310	147310 NM_00156	4q21
induced protein of 10 kDa/INP10		)	
small inducible cytokine subfamily B	****	AA361853	Chr 4
(Cys-A-Cys), member 11/SCYB11			·
small inducible cytokine subfamily B			
(Cys-X-Cys), member	1000		;
12/SCYB12/stromal:cell-drived	600835	L36033	10q11.1
factor/SDF1			
small inducible cytokine subfamily B	1	4	
(Cys-X-Cys), member 13/SCYB13	****	16 16 16 16 16 16	* * * * *
small inducible cytokine subfamily B	70.70		
(Cys-X-Cys), member 14/SCYB14	004180	AC005738	5q31
small inducible cytokine subfamily C,	03000	NM 00299	
member 1/lymphotactin/LTN/SCYC1	00000	_	1q21-q25
small inducible cytokine subfamily C,	****	NM 00317	
member 2/SCYC2		5	# # # #
small inducible cytokine subfamily D			
(Cys-X3-Cys), member	000000	NM 00299	•
NTT/NTN/S	001880	9	169
eceptor	601160	NM 00129	
	661100	S	3p21
receptor	1000	NM 00064	
	001267		3p21
eceptor		NM 00183	
	001708		3p21.3
e (C-C motif) receptor	***	NM_00550	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4/CCR4		∞	* * * * * * * * * * * * * * * * * * * *

chemokine (C-C motif) receptor 601373 9 chemokine (C-C motif) receptor 6/G
protein-coupled receptor 601835 NM_00436 7
chemokine (C-C motif) receptor 7/epstein-barr virus induced gene 1/EBI1/CCR7
chemokine (C-C motif) receptor 601834 NM_00520
chemokine (C-C motif) receptor 9/chemokine-binding protein 2/CCBP2/CCR9
chemokine (C-C motif) receptor ***** U94888
chemokine (C-X-C motif), receptor 3/G protein-coupled receptor 9/GPR9/CXCR3
chemokine (C-X-C motif), receptor 162643 NM_00346
chemokine (C-X3-C motif), receptor 601470 NM_00133
interleukin 8 receptor, alpha/IL8RA 146929 NM_00063
interleukin 8 receptor beta/IL8RB 146928 NM_00155
chemokine (C motif) XC receptor 1/G protein-coupled receptor 5/GPR5/CCXCR1

		factor (glycosylation-inhibiting	153620		22q11.2
		leukemia inhibitory factor/LFF	159540	NM_00230 9	22q12.1- q12.2
		oncostatin M	165095	AF129855	22q12.1- q12.2
		ciliary neurotrophic factor/CNTF	118945	NM_00061 4	11912.2
		epidermal growth factor/EGF	131530	NM_00196	4q25
	Synthesis	pre-B cell stimulating factor homologue/SDF1A	600835	L36034	10q11.1
		cardiotrophin 1	600435	****	***
		mast cell growth factor/MGF	184745	NM_00399 4	12q22
		granulocyte-macrophage colony stimulating factor 2/CSF2	138960	NM_00075 8	5q31.1
		macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
		granulocyte colony stimulating factor 3/CSF3	138970	NM_00075 9	17q11.2- q12
Other		epidermal growth factor receptor		NM_00522	7
Growth		EGFR	131550	8	p12.1
Factors		ciliary neurotrophic factor receptor/CNTFR	118946	NM_00184 2	9p13
		oncostatin M receptor/OSMR	601743	NM_00399 9	* * * *
		neutrophil chemotactic response receptor/gp130	162820	**	7q22-qter

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·		colony stimulating factor 1 receptor/CSFR1	164770	U63963	5q33.2- q33.3
	Receptors	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA	306250	NM_00614 0	^
		granulocyte-macrophage colony stimulating factor 2 receptor, beta/CSF2RB	138981	U18373	22q12.2- q13.1
		granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y chromasomal/CSF2RY	425000	**	Yp11
		myelocyte antigen CD105/endoglin/ENG/TGFB receptor 131195 NM_00011 component/CD105	131195	NM_00011	9q34.1
		leukocyte antigen CD 97/CD97	601211	NM_00178 4	19p13.2- p13.12
		signal transducer and activator of transcription 1/STAT 1	955009	***	2q32.2- q32.3
		signal transducer and activator of transcription 2, 113kD/STAT2	600556	NM_00541 9	***
		signal transducer and activator of transcription 3/STAT3	102582	NM_00315 0	17q21
		signal transducer and activator of transcription 6, interleukin-4 induced/STAT6	601512	601512 NM_00315	12q13
		(SH3 domain and ITAM motif)	601899	NM_00347	10p14-p13
		STAM-like protein containing SH3 and ITAM domains 2/STAM2	* * * *	***** NM_00584	***

factor 3, gamma (48kD)/ISGF3G	147574	NM_00608 	14q11.2
interferon, alpha-inducible protein 27/FI27	600009	NM_00553	14q32
interferon, alpha-inducible protein (clone IFI-6-16)/G1P3	147572	NM_00203 8	1p35
Janus kinase 1 (protein tyrosine kinase)/JAK1	147795	NM_00222	1p31.3
Janus kinase 3 (protein tyrosine kinase)/JAK3	600173	NM_00021 5	19p13.1
interleukin-1 receptor-associated kinase M/IRAK-M	* * * *	***** NM_00719	**
interleukin-1 receptor-associated kinase 1/IRAK1	601108	NM_00156 9	Xq28
interleukin-1 receptor-associated kinase 1/IRAK2	603304	NM_00157 0	***
nuclear factor, interleukin 3 regulated/NFIL3	* * * *	NM_00538 4	****
nuclear factor of activated T-cells, cytoplasmic 1/NFATC1	600489	NM_00616 2	18q23
nuclear factor of activated T-cells, cytoplasmic 2/NFATC2	600490	***	20q13.2- q13.3
nuclear factor of activated T-cells, cytoplasmic 3/NFATC3	602698	L41066	16q13-q24
nuclear factor of activated T-cells, cytoplasmic 4/NFATC4	602699	L41067	***
caspase 1, apoptosis-related cysteine protease (interleukin 1, beta, convertase)/CASP1	147678	NM_00122 3	11q22.2- q22.3

TGFB inducible early growth response/TIEG	601878	NM_00565 5	****
TGFB inducible early growth response 2/TIEG2	603301	NM_00359	* * * *
eukaryotic translation initiation factor 3, subunit 8 (110kD)/EIF3S8	603911	NM_00375	1p34.1
MAD (mothers against decanentanlegic) homolog 1/MADH1	601505	NM_00590	7-20
homolog of Xenopus forkhead activin signal transducer-1 /FAST1	603621	NM_00392	4420 8q24.3
interleukin 1 receptor accessory protein/IL1RAP	602626	NM_00218 2	3428
CCAAT/enhancer binding protein (C/EBP), delta/CEBPD	189965	NM_00519 5	20q13.1
T-lymphocytes-specific interleukin 2 inhibitor/transcription factor 8/TCF8/	189909	U12170	10p11.2
cAMP responsive element binding protein 1/CREB1	123810	NM_00437 9	2q32.3-q34
interferon-stimulated transcription factor 3, gamma (48kD)/ISGF3G	147574	NM_00608 4	14q11.2
interferon regulatory factor 3/IRF3	603734	NM_00157	19q13.3- q13.4
lymphocyte specific interferon regulatory factor/LSIRF/interferon regulatory factor 4/IRF4	601900	U52683	6p25-p23
TNF receptor-associated factor	601711	NM_00565 8	9q33-q34
TNF receptor-associated factor 2/TRAF2	601895	U12597	9q34

Cytokine Response

mitogen activated protein kinase PRKM13/MAPK13	602899	NM_00275	**
mitogen activated protein kinase SAPK2A/MAPK14	600289	NM_00131	6p21.3- p21.2
mitogen-activated protein kinase kinase 1/MAP2K1	176872	NM_00275 5	15q22.1- q22.33
mitogen-activated protein kinase kinase 2/MAP2K2	601263	L11285	***
mitogen-activated protein kinase kinase 3/MAP2K3	602315	NM_00275 6	17q11.2
mitogen-activated protein kinase kinase 4/MAP2K4	601335	NM_00301 0	17p11.2
mitogen-activated protein kinase kinase 5/MAP2K5	602520	NM_00275	****
mitogen-activated protein kinase kinase 6/MAP2K6	601254	U39065	****
mitogen activated protein kinase kinase 7/MAP2K7	603014	NM_00504 3	****
protein kinase C alpha/PRKCA	176960	NM_00273	17q22- q23.2
protein kinase C beta/PRKCB	176970	X06318	16p11.2
protein kinase C, delta/PRKCD	176977	NM_00625 4	3р
protein kinase C gamma/PRKCG	176980	****	19q13.4
protein kinase C, theta/PRKCQ	600448	NM_00625	10p15
protein kinase C, zeta/PRKCZ	176982	NM_00274 4	****
casein kinase 1 alpha 1	600505	NM_00189 2	13q13

	casein kinase 1 gamma 2	602214	96868N	19p13.3
	casein kinase 1 delta	600864		17925
	casein kinase 1 epsilon	600863	NM_00189 4	22a12-a13
	casein kinase 2 alpha 1	115440	J02853	20p13
	casein kinase 2 alpha 2	115442	NM_00189 6	
	casein kinase 2 beta	115441	X57152	6p21.3
·	phosphatidylinositol 3-kinase, regulatory subunit, polypeptide 1 (p85, 171833 alpha)/PIK3R1	171833	M61906	5q13
	phosphatidylinositol 3-kinase, regulatory subunit, polypeptide 2 (p85, 603157 beta)/PIK3R2	603157	NM_00502	19q13.2- q13.4
	5,	* * *	NM_00362	* * *
	phosphoinositide-3-kinase, catalytic, alpha polypeptide/PIK3CA	171834	NM_00621 8	3926.3
	phosphoinositide-3-kinase, catalytic, beta polypeptide/PIK3CB	602925	602925 NM_00621	***
	phosphatidylinositol 3-kinase, catalytic, delta polypeptide/PIK3CD	602839	NM_00502 6	1p36.2
	phosphatidylinositol 3-kinase, catalytic, gamma polypeptide/PIK3CG	601232	NM_00264 9	* * * *
	peptidyl-prolyl isomerase A/cyclophilin A/PPIA	123840	Y00052	7p13
	peptidyl-prolyl isomerase B/cyclophilin B/PPIB	123841	M60857	chr. 15

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	Biosynthesis	peptidyl-prolyl isomerase  C/cyclophilin C/PPIC	123842	\$71018	****
		peptidyl-prolyl isomerase			
		D/cyclophilin D/PPID	601753	601753 NM_005038	4q31.3
		peptidyl-prolyl isomerase			
		E/cyclophilin E/PPIE	***	***** VIM 006112.	****
		peptidyl-prolyl isomerase-like/PPIL1	601301	AF090992	6p21.1
		FK506 binding protein			
		1A/immunophilin/FKBP1A	186945	186945 NM_000801	20p13
		FK506 binding protein			
		2/immunophilin/FKBP2	186946	NM_004470	186946 NM_004470 1913.1-913.3
Cyclophilins	Receptors	FK506 binding protein			
•		4/immunophilin/FKBP4	600611	600611 NM_002014	****
		FK506 binding protein			
		5/immunophilin/FKBP5	602623	602623 NM_004117	***
		calcium modulating cyclophilin	0110	NM 00174	
		ligand/CAMLG	601118	٦,	5923
		protein phosphatase 3, catalyne			
		subunit, alpha isoform/calcineurin	114105	M29550	4q21-q24
		hallenspirarase 3, cararyric			
		subunit, beta isoform/calcineurin	114106	M30773	10q21-q22
		Professional Spring Service State of Contract of States of Contract of States of Contract of States of Contract of States of S			
	Response	subunit, gamma isoform/calcineurin	114107	NM_00560	Chr.8
	•	professive of regulatory		ì	
		subunit B, alpha isoform/calcineurin	601302	***	2p16-p15
		calmodulin 1/CALM1	114180	AH005370	14924-931
		calmodulin 2/CALM2	114182	114182 NM 001743 2p21.3-p21.	2p21.3-p21.1
		calmodulin 3/CALM3	114183	114183 NM_005184 9q13.2-q13.3	9q13.2-q13.3
·					
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			cytochrome P450, subfamily XXI			
		************	(steroid 21-hydroxylase)/CYP21	201910	M13936	6p21.3
			cytochrome P450, subfamily XIB			
		Bioevnthesic				
			polypeptide 2/CYP11B2	124080	124080 NM 000498	8q21
			cytochrome P450, subfamily XIB			
			(steroid 11-beta-hydroxylase),			
Non-			polypeptide 1/CYP11B1	202010	202010 NM_000497	8q21
Cytokine			nuclear receptor subfamily 3, group C,			i
Mediated			member 1/NR3C1	138040	138040 NM_000176	5q31
Immune			melanocortin 2 receptor/ACTH			
Regulation			receptor/MC2R	202200	202200 NM_000529	18p11.2
ı			mineralocorticoid			
			receptor/MCR/nuclear receptor			
			subfamily 3, group C, member	600983	600983 NM 000901	4q31.1
		Receptors	heat shock 70kD protein 1/HSPA1A	140550	140550 NM 005345	6p21.3
		and	heat shock 70kD protein-like			
		Signaling	1/HSPA1L	140559	140559 NM 005527	6p21.3
			heat shock 70kD protein 1/HSPA1B	603012	603012 NM 005346	6p21.3
			heat shock 90-kD protein 1, alpha			
			subunit/HSPCA	140571	****	1q21.2-q22
	Corticosteroi	-	heat shock 90-kD protein 1, beta			
	ds		subunit/HSPCB	140572	104988	6p12
	1		FK506-binding protein 4			
			(59kD)/FKBP4	600611	600611 NM_002014	****
			corticosteroid binding globulin			
			precursor/CBG	122500	122500 NM_001756	14q32.1
			hydroxy-D-5-steroid dehydrogenase, 3			
			b- and steroid D-isomerase 2/HSD3B2	201810	201810 NM 000198	1p13.1

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			UDP glycosyltransferase 1/UGT1	191740	NM_00107 2	Chr. 12
			UDP glycosyltransferase family 2, member B4/UGT2B4	600067	NM_00107	4q13
		Metabolism	UDP glycosyltransferase family 2, member B7/UGT2B7	890009	NM_00107 4	1914
			UDP glycosyltransferase 2 family, polypeptide B11/UGT2B11	603064	NM_00107	****
			UDP glycosyltransferase family 2, member B15/UGT2B15	690009	NM_00107 6	4q13
			UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107	1q14
			Dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1	125263	NM_00316	19q13.3
			estrogen-preferring	600043	600043 NM 005420	4q13.1
	Vitamin D	Receptors	vitamin D (1,25- dihydroxyvitamin			•
			D3) receptor/VDR	601769	601769 NM 000376	12q12-q14
	Retinoic		Retinoic acid receptor, alpha/RARA	180240	180240 NM_00096	17q12
	Acid	Keceptors	Retinoic acid receptor, beta/RARB	180220	NM_00096 5	3p24
			Retinoic acid receptor, gamma/RARG	180190	M57707	12q13
			T-cell antigen CD4/LEU3/CD4	186940	X87579	12pter-p12
			T-cell antigen CD6/T-cell		NM_00672	-
			differentiation antigen/CD6	186720	5	Chr.11
			lymphocyte antigen CD5/LEU1/CD5	153340	X04391	11913
	-		thymocyte antioen CD7/Th41/CD2		NM_00613	17q25.2-
-			100/14d1//00 minigon of 1/1/00/	100070	_	q25.3

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16p11.2	3q21		2q33-q34	7q35	11923	11923	11923	1q22-q23	1931-932	12p13-p12			4p15		10q24		6q14-q21
X13312	NM_00519 1	98900 WN 9	NM_00613 9	AF011643	NM_00007 3	NM_00073	186830 NM_00073	NM_00073	M23492	NM_00178		NM 00177	S	NM_00177	9	NM_00252	9
107265	112203	601020	186760	186930	186740	186790	186830	186780	151460	107273			107270		601752		129190
lymphocyte antigen CD19/B-lymphocyte antigen/CD19	B-lymphocyte antigen CD80 (CD28 antigen ligand 1, B7-1 antigen)/CD80	CD86 antigen (CD28 antigen ligand 2, B7-2 antigen)/CD86	T-cell antigen CD28 (Tp44)/CD28	T-cell antigen receptor, beta subunit/TCRB	CD3G antigen, gamma polypeptide (TiT3 complex)/CD3G	CD3D antigen, delta polypeptide (TiT3 complex)/CD3D	CD3E antigen, epsilon polypeptide (TiT3 complex)/CD3E	CD3Z antigen, zeta polypeptide (TiT3 complex)/CD3Z	TODOLOGIA	T-cell antigen CD69/p60/CD69	lymphoblast antigen CD38/ADP-	ribose cyclase/cyclic ADP-ribose	hydrolase/CD38	lymphoblast antigen CD39/vascular	ATP diphosphohydrolase/CD39	lymphocyte antigen CD73/5'	nucleotidase/N15/ CD/3
															Receptors		
																T-Cell	

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Activation,
Differentiati
on, and
Proliferation
(excluding
genes from
cytokine
section
above)

1 0000	-		
leukocyte antigen CD23/low-affinity receptor II for Fc portion of IgE/FCER2/CD23	151445	NM_00200	19p13.3
macrophage antigen CD 64/high-			
affinity receptor IA for Fc fragment of	J.	,	1q21.2-
IgG/FCGR1A	146760	Y10206	q21.3
lymphocye antigen CD57/LEU7/CD57	57 151290	***	Chr.11
lymphocye function-associated		NM_00177	
antigen, type 3/LAF3/LEU7/CD58	153420	6	1p13
lymphocyte antigen CD45/protein			
tyrosine phosphatase, receptor type, c		NM_00283	
polypeptide/PTPRC/CD45	151460	<b>«</b>	1q31-q32
T-cell antigen receptor, gamma subunit/TCRG	186970	M17325	7p15-p14
T-cell antigen receptor, delta subunit/TCRD	186810	L36384	14q11.2
T-cell antigen CD8, alpha polypeptide (p32)/CD8A	e 186910	NM_00176	2p12
T-cell antigen CD8, beta polypeptide/CD8B	186730	AH003859	2p12
T-cell antigen CD28 (Tp44)/CD28	186760	NM_00613	2q33-q34
cytotoxic T-lymphocyte-associated 4/CTLA4	123890	L15006	2q33
T-cell antigen receptor; alpha subunit/TCRA	186880	Z24457	14q11.2
CD89 antigen/receptor for Fc fragment of IgA/FCAR/CD89	1t 147045	NM_00200 0	19q13.4
T-cell activation antigen p250/TP250	186710	***	11pter- p11.2

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Signaling	T cell receptor-associated protein tyrosine kinase ZAP-70/ZAP70 v-mos Moloney murine sarcoma viral		L	
Signaling	v-mos Moloney murine sarcoma viral	176947	S69911	2q12
·	oncogene homolog/MOS	190060	NM_00537	8q11
	IL2-inducible T-cell kinase/ITK/T-cell tyrosine kinase EMT/EMT	186973	NM_00554 6	5q32
	mature T-cell proliferation 1/MTCP1	300116	Z24459	Xq28
·	lymphocyte-specific protein tyrosine kinase/LCK	153390	NM_00535 6	1p35-p34.3
	B-cell antigen CD20/B-lymphocyte differentiation antigen B1/CD20	112210	AH003353	11q13
	B-cell antigen CD72/CD72	107272	NM_00178 2	99
	macrophage protein 1/NRAMP1/solute carrier family 11,	600266	AH002806	2q35
	macrophage protein 2/NRAMP2/solute carrier family 11,	600523	AB015355	12q13
	T-lymphocyte antigen CDW52 (CAMPATH-1 antigen)/CDW52	114280	NM_00180	**
Recentors	B-cell antigen CD22/CD22	107266	NM_00177 1	19q13.1
ū		600074	X69397	6q21
(excluding genes from cytokine	B-cell antigen CD40/tumor necrosis factor receptor superfamily, member 5/CD40/TNFRSF5	109535	NM_00125	20q12-

	10q26.3	11p15.5	1921-923	3q13.1-	1431	1p21-p13	5q31.1	17q11.2- a12	5q33.2- q33.3	Yp11	Xp22.32	
	602267 NM_00110	602243 NM_00435	NM_00400	NM_00162	NM_00292	AH005300	NM_00075 8	NM_00075	U63963	**	306250 NM_00614	
	602267	602243	146790	601662	600323	120420	138960	138970	164770	425000	306250	
	leukocyte antigen CD156/disintegrin and metalloprotease domain 8/ADAM8/CD156	platelet antigen CD151/platelet- endothelial cell tetraspan antigen 3/PETA3/CD151	IIA for Fc fragment of IgG/FCGR2A/CD32	activated leucocyte cell adhesion molecule/CD6 ligand/ALCAM	regulator of G-protein signaling 1/RGS1	macrophage-specific colony-stimulating factor/CSF1	granulocyte-macrophage colony stimulating factor 2/CSF2	granulocyte colony stimulating factor 3/CSF3	colony stimulating factor 1 receptor/CSFR1	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y 425000 chromosomal/CSF2RY	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA	
_					Signaling		Growth Factors				Receptors	
coction	above)					·		<del> '</del>	<del>-</del>	Myeloid Progenitor Cell	Differentiati on and Proliferation	

section above)		CCAAT/enhancer binding protein (C/EBP), beta/CEBPB	189965	NM_00519 4	20q13.1
		CCAAT/enhanccr binding protein (C/EBP), epsilon/CEBPE	600749	NIM_00180 5	14q11.2
	Signaling	flt3 ligand/FMS-related tyrosine kinase 3 ligand/FLT3LG	200009	U03858	19q13.3
		FMS-related tyrosine kinase 3/FLT3	136351	NM_00411 9	13q12
		myeloid differentiation primary response gene (88)/MYD88	602170	NM_00246 8	3p22-p21.3
		BCL2	151430	M13994	18q21.3
		BCL_X/BCLX	600039	Z23115	****
		BCL2 associated protein/BAX	600040	L22473	19q13.3- a13.4
				NM_00118	6p21.3-
		BCL2-antagonist/killer 1/BAK1	600516	8	p21.2
				NM_00432	
		BCL2-associated athanogene 1/BAG1	601497	3	9p12
				NM_00428	
	-	BCL2-associated athanogene 2/BAG2	603882	2	****
		BCL2-associated athanogene 3/BAG3   603883	603883	AF095193	****
		BCL2-associated athanogene 4/BAG4   603884	603884	AF095194	****
		BCL2-associated athanogene 5/BAG5   603885	603885	AF095195	****
		BCL-X/BCL-2 binding protein/BAD	603167	AF021792	***
				NM 00119	
		BCL2-like 1/BCL2L1	600039	-	***
				NM_00405	14q11.2-
		BCL2-like 2/BCL2L2	601931	0	q12
		BCL2-like 11 (apoptosis		NM_00653	
		facilitator)/BCL2L11	603827	∞	****

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	BCL2-related protein A1/BCL2A1	601056	Y09397	15q24.3
	BCL2-interacting protein		NM 00380	
	harikari/HRK	603447	9	****
	Bcl-2 interacting killer/BIK	603392	U34584	****
	tumor protein p53/TP53	191170	X02469	17p13.1
	superfamily, member		NM 00004	
٠	6/FAS/TNFRSF6	134637		10q24.1
Anontosis	nuclear factor kappa-B DNA binding subunit 1/NFKB1	164011	M58603	4q23-q24
	nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250 2	10q24
	apoptosis-related cystein protease			11q22.2-
	1/caspase 1/CASP1	147678	L27475	q22.3
	apoptosis-related cystein protease			
	1/caspase 1/CASP2	600639	*****	7q35
	apoptosis-related cystein protease		NM_00434	4q35, 4q33
	1/caspase 1/CASP3	600636	9	q35.1
	apoptosis-related cystein protease		NM_00434	11q22.2-
	1/caspase 1/CASP4	602664	7	q22.3
	apoptosis-related cystein protease		NM_00434	11q22.2-
	1/caspase 1/CASP5	602665	7	q22.3
	apoptosis-related cystein protease		NM_00122	
	1/caspase 1/CASP6	601532	9	4q25-q25
	apoptosis-related cystein protease		NM_00122	10q25.1-
	1/caspase 1/CASP7	601761	7	q25.2
	apoptosis-related cystein protease		NM_00122	
	1/caspase 1/CASP8	601763	8	2q33-q34
	apoptosis-related cystein protease			
-	1/caspase 1/CASP9	602234	****	****

Apoptosis
(additional
genes in
Oncology)

	·q34		*		<del></del>	2		.23	1.2	1.2	1.2	1.2		q32	2	131	*	32	113	
	2q33-q34		****			1042		10q11.23	<u> </u>	16p11.2	16p11.2	16p11.2		2q31-q32	Chr.5	5923-931		2q31-q32	12q11-q13	Chr.2
NM 00123		NM_00372			NM 00161		NM 00363	,	NM_00220	N	151510 NM_00088	NM_00535	NM_00221	0	***	NM_00220 3	NM_00550 1	NM_00088 5	NM_00220 5	147556 NM_00021
	601762		603653			173870		603501	153370	120980	151510	602453		193210	192968	192974	* * *	192975	135620	147556
apoptosis-related cystein protease	1/caspase 1/CASP10	apoptosis-related cystein protease	1/caspase 1/CASP13	ADP-ribosyltransferase (NAD+; poly	(ADP-ribose)	polymerase)/PARP/ADPRT	poly (ADP-ribose)	glycohydrolase/PARG	lymphocyte antigen CD11A/integrin, alpha-L/CD11A/ITGAL	lymphocyte antigen CD11B/integrin, alpha-M/CD11B/ITGAM	lymphocyte antigen CD11C/integrin, alpha-X/CD11C/ITGAX	lymphocyte antigen CD11D/integrin, alpha-D/CD11D/ITGAD	antigen CD51/integrin, alpha-	V/vitronectin receptor/CD51/ITGAV	integrin, alpha 1/ITGA1	integrin, alpha 2/ITGA2	integrin, alpha 3/ITGA3	integrin, alpha 4/ITGA4	integrin, alpha5/fibronectin receptor, alpha subunit/FNRA/ITGA5	integrin, alpha 6/ITGA6
											Cell- Mediated	Inflammatio n								

T to tr	integrin, alpha 7/ITGA7	600536	NM_00220 6	12q13
2	integrin, alpha 8/ITGA8	604063	L36531	****
	integrin,alpha 9/ITGA9	603963	L24158	3p21.3
	integrin,alpha 10/ITGA10	604042	NM_00363	***
	antigen CD29/integrin, beta-1/CD29/ITGB1	135630	NM_00221 1	10p11.2
	leukocyte antigen CD18/integrin beta chain, beta 2/CD18/ITGB2	600065	NM_00021 1	21q22.3
	platelet antigen CD61/integrin, beta-3/CD61/ITGB3	173470	NM_00021 2	17q21.32
	integrin, beta 5/ITGB5	147561	NM_00221 3	***
	integrin, beta 6/ITGB6	147558	NM_00088 8	Chr.2
-	integrin, beta 7/ITGB7	147559	NM_00088 9	12q13.13
	integrin, beta-like 1 (with EGF-like repeat domains)/ITGBL1	604234	NM_00479	13q33
	erythrocyte antigen CD47/Rh-related antigen, integrin-associated signal		NM_00177	3q13.1-
	integrin-linked kinase/ILK	602366	NM_00451	913.2 11p15.5- n15.4
	selectin E/endothelial adhesion molecule 1/ELAM1/SELE	131210	NM_00045 0	1q23-q25
	granulocyte antigen CD62/platelet alpha-granule membrane protein/selectin P/CD62/SELP	173610	NM_00300	1923-925

	selectin L/lymphocyte adhesion molecule 1/LAM1/SELL	153240	153240 NM_00065	1923-925
	T-cell antigen CD8, alpha polypeptide (p32)/LEU2/CD8A	186910	NM_00176 8	2p12
	T-cell antigen CD8, beta polypeptide/CD8B	186730	AH003859	2p12
	leukocyte antigen CD9/MIC3/CD9	143030	NM_00176	12p13
	activated leucocyte cell adhesion molecule/CD6 ligand/ALCAM	601662	NM_00162 7	3q13.1- q13.2
Adhesion	mucosal addressin cell adhesion molecule-1/MACAM1	102670	NM_00716 4	19p13.3
Migration	platelet antigen CD151/plateletendothelial cell tetraspan antigen 3/PETA3/CD151	602243	NM_00435	11p15.5
	CD36/thrombospondin		NM_00007	
	receptor/platelet collagen	173510	7	7q11.2
			NM_00177	19p13-
	leukocyte antigen CD37/CD37	151523	4	q13.4
-	platelet antigen CD31/platelet-			
	endothelial cell adhesion molecule		NM_00044	
	1/PECAM1/CD31	173445	2	17q23
	CD26/dipeptidylpeptidase	102720	102720 NM_00193	2q23
	lymphocyte antigen CD44/hermes			
	antigen/CD44	107269	AF098641	11pter-p13
	B-cell antigen CD 48/B-cell activation		NM_00177	
	marker/BCM1/BLAST1	109530	∞	1q21.3-q22
-	leukocyte antigen CD53/tetraspan			
	antigen/CD53	151525	AJ243474   1p21-p13.3	1p21-p13.3

	B-cell antigen CD54/intercellular		NM_00020	19p13.3-
	adhesion molecule 1/ICAM1/CD54	147840		p13.2
	intercellular adhesion molecule		NM_00087	
	2/ICAM2	146630	3	17q23-q25
	intercellular adhesion molecule		NM_00216	19p13.3-
	3/ICAM3	146631	7	p13.2
;			NM_00177	19q13.3-
Other	myeloid antigen CD33/p67/CD33	159590	2	q13.4
Adnesion	granulocyte antigen CD66/biliary		NM_00171	
Moiecules	glycoprotein/CD66	109770	2	19q13.2
	leukocyte antigen CD81/target of			
	antiproliferative antibody		NM_00435	
	1/TAPA1/CD81	186845	9	11p
	reunocyte antigen CD82/R2/suppression of	600623	NM_00223	11p11.2
	COCIDITA III Chamber 1 IV A 11 (DD0)		-	
	killer cell lectin-like receptor	602890	¥'	12n13-n12
	subfamily B, member 1/KLRB1	00700	∞	aid cidai
	killer cell lectin-like receptor	161555	NM_00225	12p13.2-
	subfamily C, member 1/KLRC1	101333	6	p12.3
	killer cell lectin-like receptor	602801	NM_00226	12p13.2-
	subfamily C, member 2/KLRC2	004071	0	p12.3
	killer cell lectin-like receptor	602802	NM_00226	12p13.2-
	subfamily C, member 3/KLRC3	7/07/0	1	p12.3
	killer cell lectin-like receptor	602803	NM_00349	12p13.2-
	subfamily C, member 4/KLRC4	00200	7	p12.3
	killer cell antigen CD94/killer cell		96600 MN	12n132-
	lectin-like receptor subfamily D,	602894	2	n123
	member 1/KLRD1/CD94		7	P14.3
	T-cell antigen CD99/MIC2/CD99	313470	NM_00241	Xpter-
			۲	764.34

Peukocyt amigen CD100/semaphorin   601866   NM_00537   9q22-q31     AD/SEMA4D/CD100   1q220   AH000040   1q32     CD4/CD364   AH000040   1q32   AH000040   1q32     CD68/macrosialin/CD68   153634   1   17p13     CD68/macrosialin/CD68   153634   1   17p13     Cadherin Z, N-cadherin   NM_00179   18q11.2     Ceceptor for advanced glycation end products/RAGE   600214   AJ133822   6p21.3     Products/RAGE   600214   AJ133822   6p21.3     CD43/sialophorin/SPN/CD43   182160   3   16p11.2     Vascular cell adhesion molecule   192225   NM_00107   1p32-p31     UDP-Gal:betaGleNAc beta 1,4-   galactosyltransferase, polypeptide   604013   NM_00377   1q23     UDP-Gal:betaGleNAc beta 1,4-   galactosyltransferase, polypeptide   604014   AF038662   3q13.3     UDP-Gal:betaGleNAc beta 1,4-   galactosyltransferase, polypeptide   604014   AF038662   3q13.3     UDP-Gal:betaGleNAc beta 1,4-   galactosyltransferase, polypeptide   604014   AF038652   3q13.3     UDP-Gal:betaGleNAc beta 1,4-   galactosyltransferase, polypeptide   604015   AF038652   3q13.3     UDP-Gal:betaGleNAc beta 1,4-   GA0104   G		•				
ntigen 142230 AH000040   153634			leukocyta antigen CD100/semaphorin 4D/SEMA4D/CD100	601866		9922-931
142230 AH000040			hematopoietic progenitor cell antigen			
end 600214 NIM_00179 114020 2 end 600214 AJ133822 NIM_00312 182160 3 le 137060 NIM_00149			CD34/CD34	142230	AH000040	1q32
end 600214 1133822 cmd 600214 AJ133822 lts2160 3 3 2 2 cmd lts2160 3 3 lts2160 lts225 NM_00107 lts 604013 NM_00377 lts 604015 AF038662 lts 604016 NM_00477 cm 604016 NM_00477 cm 604016 NM_00477 cm 604016 NM_00477 lts 604016 NM_00477 cm 604016 lts 604017			macrophage antigen		NM 00125	
end 600214 AJ133822 NIM_00312 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			CD68/macrosialin/CD68	153634		17p13
end 600214 AJ133822 182160 3 192225 NM 00107 8 1e 604013 NM 00378 le 604014 NM 00377 le 604015 AF038662 le 604016 NM 00477 e 604016 NM 00477			cadherin 2, N-cadherin		NM 00179	
end 600214 AJ133822 NM_00312 182160 3 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8			(neuronal)/CDH2	114020		18q11.2
600214 AJ133822 NM_00312 182160 3 192225 R8 8 4e 137060 NM_00149 1e 604013 NM_00378 le 604014 NM_00377 le 604015 AF038662 e 604016 NM_00477 e 604016			receptor for advanced glycation end			
I 82160 3 1 19225 NM_00107 8 He 137060 NM_00149			products/RAGE	600214		6p21.3
192225 NM_00107  192225 NM_00107  1e			leukocyte antigen		NM_00312	
192225 NM_00107 8 1e 137060 NM_00149 1e 604013 NM_00378 1e 604014 NM_00377 1e 604015 AF038662 1e 604016 NM_00477 1e 604016 NM_00477			CD43/sialophorin/SPN/CD43	182160	3	16p11.2
le 604013 NM_00378 le 604014 NM_00377 le 604015 AF038662 le 604015 AF038662	,		vascular cell adhesion molecule 1/VCAM1	192225	NM_00107 8	1p32-p31
le 604013 NM_00378 le 604014 NM_00377 le 604015 AF038662 le 604016 NM_00477 e 604016			UDP-Gal:betaGlcNAc beta 1,4-			
le 604013 NM_00378 le 604014 NM_00377 le 604015 AF038662 le 604016 NM_00477			galactosyltransferase, polypeptide	137060	NM_00149	9p13
le 604013 NM_00378 le 604014 NM_00377 le 604015 AF038662 e 604016 NM_00477			וומאסאמיו			
le 604013 NM_00377 le 604014 NM_00377 le 604015 AF038662 le 604016 NM_00477 le 604016 NM_00477			UDP-Gal:betaGlcNAc beta 1,4-		00000 PAIX	
le 604014 NIM_00377 le 604015 AF038662 e 604016 NIM_00477			galactosyltransferase, polypeptide 2/B4GALT2	604013	0 0	1p33-p32
le 604014 NM_00377 le 604015 AF038662 e 604016 NM_00477 e			UDP-Gal:betaGlcNAc beta 1,4-			
le 604015 AF038662 e 604016 NM_00477			galactosyltransferase, polypeptide	604014	NM_00377	1023
e 604015 AF038662 e 604016 NM_00477	i		3/B4GALT3		ט	
le 604015 AF038662 e 604016 NM_00477	Glycosyltran	Glycosyltran	UDP-Gal:betaGlcNAc beta 1,4-			
aGlcNAc beta 1,4- nsferase; polypeptide 604016 6	sferases	sferases	galactosyltransferase, polypeptide	604015	AF038662	30133
aGlcNAc beta 1,4- nsferase; polypeptide 604016 6			4/B4GALT4			9444
nsferase, polypeptide 604016 NM_00477 6						
0			nsferase; polypeptide	604016	NM_00477	Chr.11
					0	

•			•	•	•
		UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase, polypeptide	604017	AF038664	18q11
		U.D.+CALLO			
		CD15/fucostyltransferase	104230	NM_00203	11q21
				ì	
		monocyte antigen CD87/plasminogen		39C00 MM	
		activator receptor, urokinase	173391	C0200_MINI	19913
		type/PLAUR/CD87		6	٠.
		lymphocyte antigen CD10/membrane	120520	NM_00090	l
		metalloendopeptidase/MME/CD10	120320	2	/zh-1zhc
		leukocyte antigen CD13/alanyl	002121	NM 00115	70 00 00
		aminopeptdidase/ANPEP/CD13	086161	0 055151	976-67661
		chymase 1, mast cell/CMA1	118938	118938 NM 001836	14q11.2
		tryptase alpha/TPS1	191080	191080 NM_003293	Chr.16
		matrix metalloproteinase 1 (interstitial	130051	NM_00242	11-00-00
		collagenase)/MMP1	120333	_1	626-22b11
		matrix metalloproteinase-like	**	NM_00414	***************************************
	-	1/MMPL1		2	
		matrix metalloproteinase 2 (neutrophil			
		gelatinase)/CLG4/MMP2	120360	AH002654	16q13
		matrix metalloproteinase 3			
		(stromelysin 1, progelatinase)/MMP3	185250	185250 NM 002422	11q23
		matrix metalloproteinase 8 (neutrophil			
		collagenase)/MMP8	120355	120355 NM_002424	11q21-q22
		matrix metalloproteinase 9 (gelatinase			
		B, 92kD gelatinase, 92kD type IV	·		
		collagenase)/MMP9	120361	NM_004994	120361 NM_0049940911.2-913.1
		matrix metalloproteinase 10			
	Proteases	(stromelysin 2)/MMP10	185260	185260 NM_002425 11q22.3-q23	11q22.3-q23

		matrix metalloproteinase 11			
		(stromelysin 3)/MMP11	185261	185261 NM 005940	22a11.2
		matrix metalloproteinase 12			1
Professes		(macrophage elastase)/MMP12	601046	601046 NM 002426 1922,2-922.3	1 1 a 2 2 . 2 - a 2 2
and		matrix metalloproteinase 13			
Inhibitors		(collagenase 3)/MMP13	600108	600108 NM 002427	11922.3
		matrix metalloproteinase 14	600764	NM 00499	
		(membrane-inserted)/MMP14	900/24	5 5	14911-912
		matrix metalloproteinase 15	1,7000		1
		(membrane-inserted)/MMP15	002201	, ∞	16q13-q21
		matrix metalloproteinase 16	2,000,	NM 00594	
		(membrane-inserted)/MMP16	797709		8q21
		matrix metalloproteinase 17		NM 00414	
		(membrane-inserted)/MMP17	602285		12q24.33
		matrix metalloproteinase 19/MMP19	601807	601807 NM_00242	12q14
		motrix motollogrataines			
		23A/MMP23A	603320	603320 NM_00465	1p36.3
		matrix metalloproteinase		NM 00698	
		23B/MMP23B	603321	3	1p36.3
		matrix metalloproteinase 24	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NM 00669	
		(membrane-inserted)/MMP24	¥ ¥ ¥	0	* * * *
		tryptase beta/TPS2	191081	191081 NM_003294	Chr.16
		tissue inhibitor of metalloproteinase			
		1/erythroid potentiating	206330	NM 00325	Xp11.3-
		activity/EPA/human collagenase	0/5505	4	p11.23
		IIIIIIOIIOI/HCL/ LIMP I			
	;	secretory leukocyte protease inhibitor			
	Inhibitors	(antileukoproteinase)/SLPI	107285	107285 NM 003064	***

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			mononcyte/neutrophil elastase			
<del>na Ti</del>			inhibitor/ELANH2	130135	M93056	6pter-p24
	<del>,,,,,</del>		alpha-1-microglobulin/bikunin			
			precursor/AMBP	176870	176870 NM 001633	9432-433
			alpha-2-macroglobulin/A2M	103950	103950 NM_000014 2p13.3-p12	2p13.3-p12
			CD36/thrombospondin		NM 00007	
			receptor/platelet collagen	173510		7q11.2
			CD36 antigen (collagen type I			
			receptor, thrombospondin receptor)-		NM 00550	
	,		like 1/CD36L1/SRB1	601040	ς,	Chr. 12
			CD5 antigen-like (scavenger receptor			
			cysteine rich family)/CD5L	602592	602592 NM 005894	1q21-q23
			acetyl LDL receptor/scavenger			
			receptor expressed by endothelial	* * * * *	***** NM 003693	***
			macrophage scavenger receptor			
			1/MSR1	153622	153622 NM 002445	8p22
			macrophage scavenger receptor 1-			
Cell-			like/MSRL1	602728	****	8p21
Mediated	Phagocytosis	Scavenger	mannose receptor, Cltype 1/MRC1	153618	153618 NM_002438	10p13
Pathogen	of Pathogens		endocytic receptor (macrophage			
Defense	0		mannose receptor family) (KIAA0709) ***** NM_006039	****	NM_006039	****
			toll-like receptor 1/TLR1	601194	601194 NM_003263	4p14
			toll-like receptor 2/TLR2	603028	603028 NM 003264	4q32
			toll-like receptor 3/TLR3	603029	603029 NM_003265	4q35
			toll-like receptor 4/TLR4	603030	603030 NM_003266	9q32-q33
			toll-like receptor 5/TLR5	603031	603031 NM_006068	1q41-q42
			collectin 34	****	AB002631	****
			liver collectin 1/CL-L1	****	***** NM 006438	***
			collectin receptor/complement			
	_		component C1q receptor/C1QR	120577	***	

			surfactant, pulmonary-associated			
	•		protein D/SFTPD	178635	178635 NM_003019	10q23.3
			surfactant, pulmonary-associated			
			protein A1/SFTPA1	178630	178630 NM_005411 0q22.2-q23.	0q22.2-q23.
			immunoglobulin K light chain	147200	**************************************	
<del></del>			constant region locus/IGKC	14/200		71d7
		Kappa Light	Kappa Light immunoglobulin K light chain variable		27.01200	,
		Chain	region locus/IGKV	140980	K01322	2p12
	doloonii		immunoglobulin K light chain joining	020071	***************************************	,
	icht		region locus/IGKJ	1409/0	++++	7b17
Chains	orgat ins		immunoglobulin L light chain constant	1 47000	NM_00614	7 1 1
			region locus/IGLC1	14/220		7.11.677
		Lampda	immunoglobulin L light chainjoining	147000	NM_00614	0.11
	,	Light Chain	Light Chain region locus/IGLJ	14/230		7.11p22
		4 To 18	immunoglobulin L light chain variable	076271	NM_00614	27.11.2
			region locus/IGLJ	14/240		7.11b77
		IgA Heavy	immunoglobulin A heavy chain	1 45000	7 7 7 7 7	00 00 77
-	٠.,	Chain	constant region locus 1/IGHA1	140900	+ + + +	14q32.33
		Constant	immunoglobulin A heavy chain	1 47000	) ) )	000
		Region	constant region locus 2/IGHA2	14/000		14q32.33
<del></del>		IgD Heavy				
		Chain	imminoglobiilin O keavy chain			
		Constant	constant region locus/IGHD	147170	**	14q32.33
		Region				
		Locus			-	

					,
	IgE Heavy Chain Constant Region Locus	immunoglobulin E heavy chain constant region locus/IGHE	147180	* * * *	14q32.33
	Wasall Jol	immunoglobulin G heavy chain constant region locus 1/IGHG1	147100	***	14q32.33
	Constant	immunoglobulin G heavy chain constant region locus 2/IGHG2	147110	**	14q32.33
Immunoglob ulin Heavy	Region	immunoglobulin G heavy chain constant region locus 3/IGHG3	147120	**	14q32.33
Chains		immunoglobulin G heavy chain constant region locus 4/IGHG4	147130	***	14q32.33
· ·	IgM Heavy Chain				
	Constant Region	immunoglobulin M heavy chain constant region locus/IGHM	147020	****	14q32.33
	Locus				
	Heavy Chain Variable	Heavy Chain immunoglobulin heavy chain variable Variable region locus 1/IGHV1	147070	X92279	14q32.33
	Region Locus	immunoglobulin heavy chain variable region locus 2/IGHV2	600949	***	16p11
	Heavy Chain Diversity	Heavy Chain immunoglobulin heavy chain diversity Diversity region locus 1/IGHDY1	146910	X97051	14q32.33
··	Region Locus	immunoglobulin heavy chain diversity region locus 2/IGHDY2	146990	L25544	15q11-q12
	-				

	neavy Chain Joining Region Locus	immunoglobulin heavy chain joining region locus/IGHJ	147010	**	14q32.33
		recombination activating gene	179615	NM_00044	11p13
		recommunication activating gene	179616	M94633	11p13
		immunoglobulin kappa J region recombination signal binding protein/RBPJK/IGKJRB1	147183	L07872	9p13-p12
		Bruton agammaglobulinemia tyrosine kinase/BTK	300300	NM_00006	Xq21.3-q22
	Signaling	interleukin 7 receptor/IL7R	146661	NM_00218 5	5p13
•		interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6q23-q24
ulin Gene		interferon-gamma receptor 2/IFNGR2 147569	147569	NM_00553	21q22.1- q22.2
ent ent		interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
		interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
		ligase I, DNA, ATP-dependent/LIG1	126391	NM_00023 4	19q13.2- q13.3
	Docombinoti	ligase IV, DNA, ATP-dependent/LIG4 601837	601837	NM_00231 2	13q22-q34
	On	X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
		kD/KU80/XRCC5	194364	***	2q35

		Inyrold autoantigen, /0 kD/KU70/G22P1	152690	NM_00146 9	22q11-q13
		nuclear factor kappa-B DNA binding	164011	M58603	4023-024
		subunit 1/NFKB1	10101		+7h-C7ht
		nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250 2	10q24
		nuclear factor kappa-B subunit 3/NFKB3	164014	Z22949	11q12-q13
		nuclear factor of kappa light chain			
		gene enhancer in B cells, inhibitor	164008	****	14a13
		alpha/NFKBIA			•
		nuclear factor of kappa light chain		02000	
		gene enhancer in B cells, inhibitor	603258	NM_00250	8011.2
		beta/NFKBIB		<b>.</b> .	4
		YY1 transcription factor/YY1	600013	NM_00340	14q
Immunoglob		immunoglobulin transcription factor	1 4 7 1 4 1	1 1 1 1 1 1 1	
ulin Gene	Transcriptio	1/ITF1/transcription factor 3/TCF3	14/141	÷ ÷ ÷	19p13.3
Transcriptio	n Factors	immunoglobulin transcription factor	02003	NM 00319	
a		2/ITF2/transcription factor 4/TCF4	7/7700	6	18q21.1
		immunoglobulin mu binding protein 2/IGHMBP2	600502	NM_00218	11913.2-
		transcription factor binding to IGHM	0.07	NM 00652	
		enhancer 3/TFE3	314310	, –	Xp11.22
		homeobox protein OCTI/POU domain	164176	NM 00269	
		transcription factor 2, class 1/POU2F1	1041/2	~	1422-423
		homeobox protein OCT2/POU domain	251176	7030031	
		transcription factor 2, class 2/POU2F2	1041/0	0KC77M	Chr.19
		POU domain, class 2, associating	700107	NM 00623	
		factor 1/POU2AF1	007100	5   007100	11923.1

		inhihitor of DMA binding 1 dominate		7.000	
		negative helix-loop-helix protein/ID1	600349	01700_MM	20q11
		inhibitor of DNA hinding 2 dominant		ALCOO ANTA	
		negative helix-loop-helix protein/D2	600386	9	2p25
		B-cell antigen CD40/tumor necrosis			
		factor receptor superfamily, member		NM 00125	20a12-
		5/CD40/TNFRSF5	109535	۱ 0	q13.2
		paired box gene 5/B-cell lineage-			
		specific activator protein/BSAP/PAX5 167414	167414	***	9p13
		lymphocye function-associated		NM 00177	
		antigen; type 3/LFA3/LEU7/CD58	153420	١٥	1p13
		interleukin 10 receptor, alpha/IL10RA	146933	NM_00155 8	11q23.3
•		lymphocyte antigen CD45/protein			
		tyrosine phosphatase, receptor type, c		NM 00283	
		polypeptide/PTPRC/CD45	151460	, <b>∞</b>	1q31-q32
		prostaglandin E receptor 1, EP1			
		subtype/PTGER1	176802	176802 NM 000955	19p13.1
		prostaglandin E receptor 2, EP2			
		subtype/PTGER2	176804	****	5p13.1
		prostaglandin E receptor 3, EP3			
	Signaling	subtype/PTGER3	176806	176806 NM_000957	1p31.2
Imminooloh		prostaglandin E receptor 4, EP4			
ulin Isotyne		subtype/PTGER4	601586	601586 NM_000958	5p13.1
Switching		interleukin 13 receptor, alpha	0000	NM 00156	;
		1/IL13RA1	900119	0	Chr.X
		interleukin receptor 13 alpha2/IL13A2   300130	300130	X95302	Xq24
		interferon-gamma receptor 1/IFNGR1 107470 NM_00041	107470	NM_00041	6q23-q24
				)	

			COLVERY	147550	NM_00553	21q22.1-
			Interieron-gamina receptor 2/1FINGR2 14/309	14/309		q22.2
			interleukin 5 receptor alpha/IL5RA	147851	M96652	3p26-p24:
			transforming growth factor, beta		NW 00461	
Defense			receptor I (activin A receptor type II-	190181	10±00_0	9q33-q34
Froieins and			like kinase, 53kD)/TGFBR1		1	
Feprides			transforming growth factor, beta	100182	NM_00324	327
			receptor II (70-80kD)/TGFBR2	1201051	2	
			transionning grown factor, oeta		NM 00324	
			receptor III (betaglycan,	600742		1p33-p32
			X-ray repair, complementing defect in			
		:				
		Kecombinati		194364	****	2q35
	•	uo	thyroid autoantigen, 70		NM_00146	
			kD/KU70/G22P1	152690	6	22q11-q13
			complement component 1, R	216050	216050 NM_00173	12513
			subcomponent/C1R	210200	3	61421
			complement component 1, S	120580	NM_00173	12n13
			subcomponent/C1S	120360	4	
			complement component 1, Q			1n36 3-
			subcomponent, alpha	120550	***	n34 1
			polypeptide/C1QA			F2
			comprement component 1; V			1036.3-
			subcomponent, beta	120570	*	p34.1
			complement component 1, Q			1,136.3
			subcomponent, gainina	120575	***	1,000.0-
			polypeptide/C1QG			F.T.C4
		-	complement component 1, Q	601269	NM_00121	17013.3
			subcomponent binding protein/CIQBP		2	

complement component 1 inhibitor (angioedema, hereditary) /CINH	106100	NM_00006	11911-
 complement component 2/C2	217000	NM_00006	6p21.3
complement component 3/C3	120700	NM_00006 4	19p13.3- p13.2
complement component 4B/C4B	120820	NM_00059	6p21.3
 complement component 5/C5	120900	NM_00173 5	9q34.1
 complement component 6/C6	217050	NM_00006 5	5p13
 complement component 7/C7	217070	NM_00058	5p13
 complement component 8, alpha polypeptide/C8A	120950	NM_00056 2	1p32
 complement component 8, beta polypeptide/C8B	120960	00000 NM 6	1p32
 complement component 8, gamma polypeptide/C8G	120930	09000 MM 6	9q34.3
 complement component 9/C9	120940	NM_00173	5p13
 complement factor H/H factor 1/HF1	134370	NM_00018 6	1q32
 I factor (complement)/肝	217030	NM_00020 4	4q25
 decay-accelerating factor for complement/DAF/CD55	125240	S72858	1q32
perforin 1/preforming protein/PRF1	170280	NM_00504 1	10q22

Classical Pathway

Complement

	-				
		leukocyte antigen p18- 20/protectin/CD59	107271	M95708	11p13
		T-cell antigen CD46/membrane			
		cofactor protein/MCP/measels virus			
		receptor/CD46	120920	Y07713	1932
		erythrocyte antigen CD55/decay-			
		accelerating factor for			
		complement/DAF/CD55	125240	S72858	1q32
,		leukocyte antigen p18-			
		20/protectin/CD59	107271	M95708	11p13
		erythrocyte antigen CD35/complement			
		receptor CR1 (receptor for	120620	AH002679	1932
		components C3b/C4b)/CD35/CR1			ı
•		complement component 3a receptor 1/C3AR1	****	NM_00405 4	* * * *
		complement component 4-binding protein, alpha/C4BPA	120830	MM	1432
: .		complement component 4-binding protein, beta/C4BPB	120831	NM_00071 6	1932
		complement component 5 receptor 1 (C5a ligand)/C5AR1	113995	NM_00173 6	Chr.19
		antigen CD21/CD21	***	X98257	***
		B-factor, properdin/BF	138470	NM_00171 0	6p21.3
	Alternative Pathway	properdin P factor, complement/PFC	312060	NM_00262 1	Xp11.4- p11.23
		adipsin/complement factor D precursor/DF	134350	NM_00192 8	* * *
				,	

		defensin, alpha 1, myeloid-related	10000	10.00 NM 00408	8p23.2-
		sequence/DEFA1	077571	14	p23.1
		defensin, alpha 3, neutrophil- specific/DEFA3	**	NM_00521	*
		defensin, alpha 4/corticostatin/DEFA4 601157	601157	NM_00192 5	Chr.8
		defensin, alpha 5/DEFA5	600472	Σ	8pter-p21
		defensin, alpha 6, Paneth cell- specific/DEFA6	600471	NM_00192 6	8pter-p21
		defensin, beta 1/DEFB1	602056	NM_00521 8	8p23.2- p23.1
		defensin, beta 2/DEFB2	602215	NM_00494 2	8p23.1-p22
		ribonuclease, RNase A family, 2/eosinophil-derived	131410	131410 NM_00293	14024-031
		neurotoxir/EDN/RNASE2		4	1 Ch-+7h+1
		ribonuclease, RNase A family,		NM 00293	
		3/eomnophil cationic protein/ECP/RNASE3	31398	5	14q24-q31
		myeloperoxidase/MPO	254600	102694	17q23.1
	·	eosinophil peroxidase/EPX	131399	NM_00050 2	* * * *
	Defensins and Related	cathelicidin antimicrobial peptide/CAMP	600474	NM_00434 5	3p21.3
	Protective Proteins	lysozyme/LYZ	153450	NM_00023 9	Chr.12
Acute		chitinase 1/CHIT1	600031	NM_00346 5	1q31-q32
Protection		lactotransferrin/LTF	150210	NM_00234	3q21-q23

Pathogens		polyadenylate binding protein/TIA1	603518	M77142	2p13	-
0		TIA1 cytotoxic granule-associated RNA-binding protein-like 1/TIAL1	603413	NM_00325 2	10q	
		granulysin/NKG5	603082	NM_00643 3	2p12-q11	
	_	neutrophil azurocidin/NAZC	162815	M96326	19p13.3	
		bactericidal/permeability-increasing protein precursor/BPI	109195	NM_00172 5	20q11.23- q12	
·		lipopolysaccharide-binding protein/LBP	151990	AF105067	20q11.23- q12	
		monocyte antigen CD14/monocyte differentiation antigen/CD14	158120	NM_00059 1	5q31.1	
		proteoglycan 1, secretory granule/serglycin/PRG1	177040	NM_00272 7	10q22.1	
		proteoglycan 2, bone marrow/natural killer cell activator, eosinophil granule		***** NM_00272	**	
		prepro-major basic protein homolog/MBPH	**	NM_00609	***	
		neuronal pentraxin LNPTX1	602367	NM_00252 2	17q25.1- q25.2	
		neuronal pentraxin II/NPTX2	05/009	U26662	7q21.3- q22.1	
·	Pentraxins	pentaxin-related gene, rapidly induced by IL-1 beta/PTX3	602492	NM_00285 2	3q25	
		aniyloid P component, serum/APCS	104770	NM_00163	1q21-q23	
		C-reactive protein, pentraxin-related/CRP	123260	X56214	1q21-q23	
		4czf01_xis	•	•	•	Pag

		mast cell IgE receptor alpha	147140	* * * *	1q23
		mast cell IgE receptor beta	147138	147138 NM_00013	11913
		mast cell IgE receptor beta polypeptide/FCER1G	147139	NM_00410 6	1423
		granulocyte antigen CD62/platelet		00000 7814	
		aipna-granule incinorane protein/selectin P/CD62/SELP	173610	NM_00300	1923-925
		neutrophil antigen CD16/low-affinity			
	Receptors		146740	M24853	1923
		IgG/FCGR3A/CD16			•
Degranulatio		prostaglandin I2			
Jo u		receptor/PTGIR/prostacyclin receptor   600022 SEG_HUMIR	600022	SEG_HUMIL	19q13.3
Platelets, Mast Cells,		formyl peptide receptor 1/FPR1	136537	NM_00202 9	Chr.19
Neutrophils, and		formyl peptide receptor-like 1/FPRL1	136538	NM_00146	19q13.3- q13.4
Eosinophils		formyl peptide receptor-like 2/FPRL2	136539	NM_00203	19q13.3-
		lipoxin A4 receptor	****	AF054013	***
		inositol polyphosphate-5-phosphatase,	601607	NM_00554	PC 76-6
		phosphatase/SHIP/INPP5D	780100		/ch-achz
		v-yes-1 Yamaguchi sarcoma viral	1/6100	NM 00235	
:	Sionaling	related oncogene homolog/LYN		0	8q13-qter
		guanine nucleotide binding protein (G protein), a polypeptide/GNAO		600998 NM_00207	9421
•					

-					
		guanine nucleotide binding protein (G	139360	NM_00207	3n71
		polypeptide 2/GNAI2	122200	0	1740
		phospholipase A2 group	172411	172411 NM_000300	1p35
		phospholipase A2 group IB/PLA2G1B	172410	172410 NM_000928 12q23-q24.	12q23-q24.1
		phospholipase A2 group X/PLA2G10   603603 NM_003561   16p13.1-p12	603603	NM_003561	16p13.1-p12
		phospholipase A2 group			
		IVA/PLA2G4A	600522	U08374	1q25
		phospholipase A2 group VI/PLA2G6	603604	AF064594	22q13.1
		phospholipase A2 group			
		IVC/PLA2G4C	603602	603602 NM_003706	chr. 19
	Dhoenholinge	phospholipase A2 group V/PLA2G5	601192	601192 NM_000929	1p36-p34
	т поѕрпопраз ес	phospholipase C, beta 2/PLCB2	604114	604114 NM_004573	15q15
	3	phospholipase C, beta 3/PLCB3	600230	U26425	11913
7		phospholipase C, beta 4/PLCB4	600810	600810 NM_000933	20p12
Kelease of		phospholipase C, delta 1/PLCD1	602142	602142 NM_006225	3p22-p21.3
Tinide		phospholipase C, epsilon/PLCE	600597	600597 NM 006226	2q33
Lipius		phospholipase C, gamma 1 (formerly			
Common to		subtype 148)/PLCG1	172420	172420 NM_002660 20q12-q13.1	20q12-q13.1
rar, uposin, Igukotriene		phospholipase C, gamma 2			
icanoniene,	•	(phosphatidylinositol-specific)/PLCG2 600220 NM_002661	600220	NM_002661	16q24.1
nrostaolandi		lysosomal acid lipase/LIPB	278000	278000 NM_000235	10q24-q25
n pathways)		lipocortin 1/annexin 1/ANXA1	151690	V00546	9q11-q22
\ \frac{1}{2} \cdots		lipocortin 2/annexin 2/ANXA2	151740	D00017	15q21-q22
		lipocortin 3/annexin 3/ANXA3	106490	M20560	4q21
	Annexins	lipocortin 5/annexin 5/ANXA4	131230	NM_00115 4	4q26-q28
		lipocortin 7/annexin 7/ANXA1	186360	186360 NM_00403	10q21.1- q21.2

		arachidonate 12-lipoxygenase, 12R	602741	NM_00113	17pter-
	Arachidonat	type/ALOX12B	1+/500	6	p13.1
	A actional	arachidonate 15-	1,5000	NM 00114	
-	Metabolism	lipoxygenase/ALOX15	766761		1/p13.3
		arachidonate 15-lipoxygenase, second	209209	NM_00114	****
		type/ALOX15B	10000	1	
		prostaglandin endoperoxide synthetase			
		1/COX1/PTGS1	176805	AH001520	9q32-q33.3
		prostaglandin endoperoxide synthetase			
		2/COX2/PTGS2	600262	NM_000963	600262 NM_000963 1925.2-925.3
		thromboxane A synthase 1/TBXAS1	274180	274180 EG_D34613	7q34
	Biosynthesis	prostaglandin D2 synthase			
		(hematopoietic)	602598	****	****
	A. S. P. S. L.	prostaglandin D2 synthase (21kD,			
		brain)/PTGDS	176803	M61900	****
	, și Ver	prostaglandin 12 synthase/prostacyclin			
		synthase/PTGIS	601699	601699 EG_D83393	20q13
		prostaglandin E receptor 1, EP1			
		subtype/PTGER1	176802	176802 NM_000955	19p13.1
		prostaglandin E receptor 2, EP2			
Prostaglandi		subtype/PTGER2	176804	****	5p13.1
ns		prostaglandin E receptor 3, EP3			
		subtype/PTGER3	176806	176806 NM 000957	1p31.2
		prostaglandin E receptor 4, EP4			
	Receptors	subtype/PTGER4	601586	601586 NM 000958	5p13.1
		prostaglandin F receptor/PTGFR	600563	L24470	1p31.1
		prostaglandin F2 receptor negative			
		regulator/PTGFRN	601204	U26664	U26664 [1p13.1-q21.3

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		_				
			prostaglandin I2			
			receptor/PTGIR/prostacyclin receptor	600022	600022 SEG_HUMIN	19q13.3
			solute carrier family 21 (prostaglandin			
			transporter), member 2/SLC21A2	601460	601460 NM_005630	3q21
			15-hydroxyprostaglandin			
		Catabolism	dehydrogenase/HPGD	601688	601688 NM_000860	4q34-q35
			aldo-keto reductase family 1, member			
			C2/AKR1C2	600450	600450 NM 001353	10p15-p14
		Biosynthesis	CDP-choline:alkylacetylglycerol cholinephosphotransferase	* * * *	***	****
			platelet activating factor	00000		
Moleculo		Receptors	receptor/PTAFR	1/3393	M88177	1p35-p34.3
Mediators of			platelet activating factor	007107	NM 00508	
Inflammatio	Platelet		acetylhydrolase 1/PAFAH1	601690	4	6p21.2-p12
п	Activating Factor (PAE)	• 7	acetylhydrolase, isoform 1B, alpha	601545	NM_00043	17p13.3
	(101) (1111		prateret activating factor		2000	
		Catabolism	acetylhydrolase, isoform 1B, beta	602508	NM_00257 2	11923
			acetylhydrolase, isoform 1B, gamma	603074	NM_00257	19q13.1
			platelet activating factor acetylhydrolase 2/PAFAH2	602344	NM_00043	***
			arachidonate 5-lipoxygenase/ALOX5	152390	9000_MN 8	Chr.10
			arachidonate 5-lipoxygenase- activating protein/FLAP/ALOX5AP	603700	NM_00162 9	13q12
		Biosynthesis	arachidonate 12-lipoxygenase, 12R  Biosynthesis type/ALOX12B	603741	NM_00113	17pter- p13.1

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Lipoxins		Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
		Suranny in an spepinase	137181	AH002728	22q11.1
		Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412 1	****
	Receptors	lipoxin A4 receptor	****	AF054013	****
	Catabolism	Catabolism renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
		arachidonate 5-lipoxygenase/ALOX5	152390	09000_MN 8	Chr.10
		arachidonate 5-lipoxygenase- activating protein/FLAP/ALOX5AP	603700	NM_00162 9	13q12
		leukotriene A4 hydrolase/LTA4H (aminopeptidase)	151570	NM_00089 5	12922
	Synthesis	leukotriene C4 synthase/LTC4S	246530	NM_00089	5435
Leukotrienes		Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
		oannia-giutanymanspepmase	137181	AH002728	22q11.1
		Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412	****
	Recentors	cysteinyl leukotriene receptor 1/CYSLT1	300201	NM_00663 9	Xq13-q21
•		leukotriene b4 receptor (chemokine receptor-like 1)/LTB4R	601531	NM_00075	14q11.2- q12
	Catabolism	renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
	Biosynthesis	Biosynthesis Histidine Decarboxylase	142704	M60445	15q21-q22

		histamine H1 receptor/HRH1	600167	NM_00086 1	3p21-p14
	Receptors	histamine H2 receptor/HRH2	142703	AB023486	***
Histamine		histamine H3 receptor/HRH3	* * * *	NM_00723	**
		Histamine N-methyltransferase	***	D16224	chr. 2
	Catabolism	Amine oxidase (copper-containing) 2/AOC2	602268	D88213	17q21
		Amine oxidase (copper-containing) 3/AOC3	603735	AF054985	17q21
		aromatic L-Amino Acid			
		Decarboxylase/AADC	107930	M76180	7p11
		tryptophan hydroxylase/TPH	191060	X52836	11p15.3-p14
·	Synthesis	14-3-3 protein ETA	113508	X78138	22q12
	٠	14-3-3 protein ZETA	601288	M86400	2p25.2-p25.
		14-3-3 protein BETA	601289	X57346	20q13.1
		14-3-3 protein SIGMA	601290	X57348	****
		serotonin 5-HT receptors 5-HT1A, G			
		protein-coupled	109760	X57829	5q11.2-q13
		serotonin 5-HT receptors 5-HT1B, G			
		protein-coupled	182131	M81590	6q13
		serotonin 5-HT receptors 5-HT1C, G			
	•	protein-coupled	312861	U49516	Xq24
		serotonin 5-HT receptors 5-HT1D, G			
Corotonin	•	protein-coupled	182133	M81590	1p36.3-p34.3
	Recentors	serotonin 5-HT receptors 5-HT1E, G			
	s ioidaaaa	protein-coupled	182132	M91467	6q14-q15
		serotonin 5-HT receptors 5-HT1F, G			
		protein-coupled	182134	L05597	3p12

			serotonin 5-HT receptors 5-HT2A, G			
			protein-coupled	182135	D87030	13q14-q21
			serotonin 5-HT receptors 5-HT2B, G			
	Till Mary 10	-	protein-coupled	601122	X77307	2936.3-937.1
			serotonin 5-HT receptors 5-HT2C, G		1	
			protein-coupled	312861	U49516	Xq24
		Uptake	serotonin transporter	182138	X70697	17q11.1-q12
			monoamine oxidase A/ MAOA	309850	M69226	Xp11.23
		Catabolism	monoamine oxidase B MAOB	309860	M69177	Xp11.23
			serotonin N-Acetyltransferase/SNAT	056009	U40347	17q25
			tryptophan 2,3-dioxygenase/TDO2	191070	191070 NM 005651	4q31-q32
			nitric oxide synthetase 1/NOS1	163731	AH001515	12q24.2- q24.31
			nitric oxide syuthetase 2A/NOS2A	163730	X85766	17cen-q11.2
			macrophage nitric oxide synthetase 2B/NOS2B	600719	AH006623	17p13.1- q25
	Nitric Oxide Pathwav	Synthesis	macrophage nitric oxide synthetase 2C/NOS2C	600720	600720	17p13.1-
			nitric oxide synthetase 3/NOS3	163729	AH001515	7936
			chondrocyte nitric oxide synthetase 3/NOS4	163728	X73029	***
			arginase/ARG1	207800	NM_00004 5	* * * * *
			arginase/ARG2	107830	NM_00117	14q24.1-
			1 ( 1 ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (		7	q24.3
			endomenn I/EDNI	131240	NM_001955	6p24-p23
		Synthesis	endothelin 2/EDN2	131241	131241 NM 001956	1p34
-		_	endothelin 3/EDN3	131242	131242 NM 00011400q13.2-q13.	0q13.2-q13.2

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	Endothelin		endothelin converting enzyme 1/ECE1 600423 NM_001397	600423	NM_001397	1p36.1
			endothelin A receptor isoform delta		l)	
		Receptor	3/EDNRA	131243	AF014826	Chr.4
Vascularizati			endothelin receptor type B/EDNRB	131244	131244 NM_000115	13922
uo			vascular endothelial growth factor			
	Vocamor		A/VEGFA	192240	M32977	6p.12
	v ascular Endetheliel	Cruethoofe	vascular endothelial growth factor			
	Crounth	Synthesis	B/VEGFB	601398	U52819	11q13
	Growen		vascular endothelial growth factor			
	ractor		CVEGFC	601528	X94216	***
		Receptor	VEGF receptor	191306	X61656	4q12
			dopamine beta hydroxylase/DBH	223360	96000A	9q34
		Synthosis	phenylethanolamine-N-	171100	NM 00268	
		Synthesis	methyltransferase/PNMT	0611/1	9	77b-17b/1
			tyrosine hydroxylase/TH	191290	X05290	11p15.5
			aiplia-1a-auronoigio	104219	M76446	Chr.20
			arpina-10-auronoi gro	104220	L31773	£6433
			arpha-10-aulthergro	104221	D25235	8p21
			aipiia-1u-aulciicigic	104222	M76446	20p13
			arpira-za-auronorgio	104210	M18415	10q24-q26
			aipna-20-aurchtigic	104260	AF005900	Chr.2
				104250	J03853	4q16.1
			beta-1-adrenergic receptor/ADRB1	109630	J03019	10q24-q26
		Recentors	Beta-2-Adrenergic ReceptorADRB2	109690	M15169	5q32-q34
		Stordanne	beta-adrinergic receptor kinase	100626	NM_00161	1.1
			1/BARK1	102020	6	i i cen-q i s
			Beta-2-Adrenergic Receptor-Like	109760	X57870	50112013
			Protein G-21/ADRB2L	00//01	V2/027	74114c
			Beta-3-Adrenergic Receptor/ADRB3	169601	X70811	8p12-p11.2

7 2 2 2 3		Beta-Adrenergic Receptor Kinase I/ADRBK1	109635	X61157	11cen-q13
Epinepurine and Noreninenhr		Beta-Adrenergic Receptor Kinase 2/ADRBK2	109636	X69117	22q11
ine		phosphodiesterase 4A, cAMP-specific/PDE4A	600126	NM_00620 2	19p13.2
		phosphodiesterase 4B, cAMP-specific/PDE4B	600127	600127 NM_00260	1p31
		phosphodiesterase 4C, cAMP-specific/PDE4C	600128	****	Chr.19
	Response	phosphodiesterase 4D, cAMP-specific/PDE4D	600129	NM_00620 3	5q12
		phosphodiesterase 7A, cAMP-specific/PDE7A	171885	L12052	8q13-q22
		phosphodiesterase 8A, cAMP-specific/PDE8A	602972	AF056490	**
		phosphodiesterase 9A, cAMP-specific/PDE9A	602973	NM_00260 6	21q22.3
		Vesicular Amine Transporter 2/VAT2	193001	L09118	10q25
	Untake	Vesicular Amine Transporter 1/VAT1	193002	****	8p21.3
		Solute carrier family 6, member 5/SLC6A2/NAT1/NET1	163970	NM_00104 3	16q12.2
		Monoamine Oxidase A/MAOA	309850	M69226	Xp11.23
	Catabolism	Monoamine Oxidase B/MAOB	309860	M69177	Xp11.23
		Catechol-O-Methyltransferase/COMT	116790	M58525	22q11.2
		Aromatic L-Amino Acid			
	Biosynthesis	Decarboxylase/AADC/dopa decarboxylase	107930	M76180	7p11
		Tyrosine Hydroxylase	191290	X05290	11p15.5

		Dopamine Receptor D1	126449	X58987	5q35.1
		Dopamine Receptor D2/DRD2	126450	NM_00079 5	11923
٠.	Receptors	Dopamine Receptor D3/DRD3	126451	U32499	3q13.3
-		Dopamine Receptor D4	126452	L12398	11p15.5
Donamine		Dopamine Receptor D5	126453	M67439	4p16.1- p15.3
ammada a	Reuptake	Dopamine Transporter/ DAT1	126455	L24178	5p15.3
		Dopamine Beta- Hydroxylase/monooxygenase	223360	X00096	9q34
		Catechol-O-Methyltransferase	116790	M58525	22q11.2
		Monoamine Oxidases A	309850	M69226	Xp11.23
	Cataholism	Monoamine Oxidases B	309860	M69177	Xp11.23
·		Phenol Sulfotransferase 1	171150	L10819	16p12.1- p11.2
		Phenol Sulfotransferase 2	601292	X78282	16p12.1- p11.2
		Phenol Sulfotransferase 3	600641	L19956	16p11.2
	Biosynthesis	Biosynthesis adenylosuccinate lyase/ADSL	103050	103050 NM_000026	22q13.1
		adenylosuccinate synthetase/ADSS	103060	103060 NM_001126	1cen-q12
		Adenosine A1 Receptor; Adora1/G			
		protein-coupled	102775	L22214	1q32.1
		Adenosine A2 Receptor; Adora2a/G			
		protein-coupled	102776	X68486	22q11.2
<del></del>		Adenosine A2b Receptor; Adora2b/G			
		protein-coupled	600446	X68487	17p12-p11.2
		Adenosine A3 Receptor; Adora3/G			
		protein-coupled	600445	L20463	1p21-p13

Receptors		102777	***	10q25.3-q26.
· · · · · · · · · · · · · · · · · · ·		600845	600845 NM_002558	***
· · ·				
		600843	Y07683	11912
Adenosine	rs Punnergic Receptor P2x, Ligand-			
	Gated Ion Channel, 4; P2rx4	600846	AF000234	12q24.32
	Purinergic Receptor P2x, Ligand-			
	Gated Ion Channel, 5; P2rx5	602836	602836 NM 002561	***
	Purinergic Receptor P2x, Ligand-			
	Gated Ion Channel, 7; P2rx7	602566	Y09561	12q24
	P2Y11 purinoceptor/G protein-	602697	***	***
-	P2Y7 purinoceptor/leukotriene B4			
	receptor/G protein-coupled	601531	601531 NM_000752 14q11.2-q12	14q11.2-q1
	P2Y2 purinoceptor/G protein-coupled	600041	U07225	1q13.5-q14.1
	P2Y1 purinoceptor/G protein-coupled	601167	U42029	3q25
	P2Y4 pyrimidinergic receptor/G			
	protein-coupled	300038	300038 NM_002565	Xq13
	P2Y6 pyrimidinergic receptor/G			
	protein-coupled	602451	602451 NM_004154	11913.5
	Solute carrier family 29 (nucleosides),			
Reuntake		602193	602193 NM_0049556p21.2-p21.	6p21.2-p21.
	Solute carrier family 29 (nucleosides),			
	member 2/SLC29A2/ENT2	602110	X86681	11913
Catabolism	m adenosine deaminase	102700	102700 NM_000022	20q13.11
	Choline acetyltransferase/CHAT	118490	118490 NM_003055	10q11.2
Biosynthe	Biosynthesis carnitine acetyltransferase/CRAT	600184	600184 NM_004003	9q34.1
	apolipoprotein E	107741	107741 NM_000041	19q13.2

	_		Cholinergic Receptor, Muscarinic, 1:			
			CHRM1	118510	X15263	11913
			Cholinergic Receptor, Muscarinic, 2;			
			CHRM2	118493	U19800	7q35-q36
			Cholinergic Receptor, Muscarinic, 3;			
			CHRM3	118494	U29589	1q41-q44
			Cholinergic Receptor, Muscarinic, 4;			
			CHRM4	118495	M16405	11p12-p11.2
			Cholinergic Receptor, Muscarinic, 5;			
			CHRM5	118496	AF026263	15q26
			Nicotinic, Cholinergic receptor alpha 1	100690	X70108	2q24-q32
Neurotransm			Nicotinic, Cholinergic receptor alpha 2 118502	118502	U62431	Chr.8
itter and		Receptors	Nicotinic, Cholinergic receptor alpha 3	118503	X53559	15q24
Peptide	Acetylcholin		Nicotinic, Cholinergic receptor alpha 4 118504	118504	U62433	20q13.2-q13
Hormone	Ð		Nicotinic, Cholinergic receptor alpha 5	118505	M83712	15q24
Inflammetor			Nicotinic, Cholinergic receptor alpha			
>			7/CHRNA7	118511	U40583	15q14
Modulation			Nicotinic, Cholinergic receptor beta 1	100710	X14830	17p12-p11
			Nicotinic, Cholinergic receptor beta 2	118507	Y08415	1p21
			Nicotinic, Cholinergic receptor beta 3	118508	X67513	8p11.2
			Nicotinic, Cholinergic receptor beta 4	118509	X68275	15q24
			Nicotinic, Cholinergic receptor epsilon			
			polypeptide	100725	X66403	Chr.17
			Nicotinic, Cholinergic receptor,	100720	X55019	2q33-q34
			Nicotinic, Cholinergic receptor,	100730	100730 NM_005199	2q33-q34
		Reuptake	Vesicular acetylcholine transporter	988009	600336 NM_003055	10q11.2
		-	Acetylcholinesterase/ACHE	100740	M55040	7q22
			butyrylcholinesterase 1/serum			
		Catabolism	cholinesterase 1/BCHE1	177400	177400 NM_0000553926.1-926.2	3q26.1-q26.

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		briefs ment late all the anti-			
		outyrytchonnestarase z/serum			
		cholinesterase 2/BCHE2	177500	****	2q33-q35
		voltage-dependent calcium channel,			
		P/Q type, alpha 1A	141500	141500 NM 000068	19p13
		calcium channel, voltage-dependent, L			
		type, alpha 1B subunit/CACNA1B	601012	601012 NM_000718	9q34
		calcium channel, voltage-dependent, L	<u> </u>		
		type, alpha 1C subunit/CACNA1C	114205	114205 NM_000719	12p13.3
		calcium channel, voltage-dependent, L			
		type, alpha 1D subunit/CACNA1D	114206	114206 NM_000720	3p14.3
		L-type voltage dependent calcium			
	Calcium	channel alpha 1S subunit/CACNA1S	114208	114208 NM_000069	1q32
	Channels	calcium channel, voltage-dependent,			
		beta 1 subunit/CACNB1	114207	114207 NM 000723	17q21-q22
•		voltage dependent calcium channel			
		beta 2 subunit/CACNB2	600003	U07139	10p12
		calcium channel, voltage-dependent,			
		alpha 2/delta subunit/CACNA2D1	114204	Z28613	7q21-q22
		calcium channel, voltage-dependent,			
		gamma subunit/CACNG	114209	114209 NM_000727	17q24
		neuronal voltage dependent calcium			
		channel gamma subunit/CACNG2	602911	602911 NM 006078	****
		sodium channel, nonvoltage-gated 1,			
	Sodium	beta (Liddle syndrome)/SCNN1B	09/009	600760 NM_000336 16p13-p12	16p13-p12
	Channels	sodium channel, nonvoltage-gated 1,			
		gamma/SCNN1G	19/009	600761 NM_001039 16p13-p12	16p13-p12
Channels		cyclic nucleotide gated			
	<u> </u>	hyperpolarization activated potassium   602780   AF064876	602780	AF064876	****

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		cyclic nucleotide gated			
		hyperpolarization activated potassium	602781	AF064877	****
		potassium inwardly-rectifying channel,	_		
		subfamily J, member 2 (KCNJ2	600681	600681 NM 000891	Chr. 17
		voltage dependent potassium channel,			
		subfamily K, member 2/KCNK2	603219	****	1941
		G protein coupled potassium channel,			
	Potassium	subfamily J, member	601534	601534 NM 002239	2q24.1
	Channels	G protein coupled potassium channel			
		inward rectifier/GIRK3	600932	***	1921-923
		voltage dependent potassium channel,			
		subfamily S, member 3/KCNK3	603888	AF043472	2p24
		potassium voltage-gated channel			
		precursor, KQT-like subfamily,			
		member 1/KCNQ1	192500	192500 NM 000218	11p15.5
		potassium intermediate/small			
		conductance calcium-activated			
		channel, subfamily N, member	602754	602754 NM 002250	19q13.2
		chloride channel, calcium activated,			
	-	family member 1/CLCA1	906609	603906 NM_001285	1p31-p22
	Chloride	chloride channel, calcium activated,			
	2	family member 2/CLCA2	604003	604003 NM_006536	****
		cystic fibrosis transmembrane			
		conductance regulator/CFTR	602421	602421 NM_000492	7q31.2
		membrane			
		metalloendopeptidase/MME/neutral			
		endopeptidase	120520	120520 AH002677	3q21-q27
		proopiomelanocortin	176830	176830 NM 000939	2p23.3

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		nreproporicentin/nociseartin/nocistatin/			
	Biosynthesis		601459	***	8n21
		preproenkephalin			
		B/prodynorphin/PDYN	131340	NM_006211	131340 NM_00621120pter-p12.21
		preproenkephalin			
Opioids		A/proenkephalin/PENK	131330	131330 NM 006211	8q23-q24
	•	Opioid Receptor, Mu-1; Oprm1	600018	NM_00091 4	6q24-q25
		Opioid Receptor, Kappa-1; Oprk1	165196	U17298	8q11.2
	• ***	opioid receptor-like 1/OPRL 1	602548	X77130	****
	Recentors	Opioid Receptor, Delta-1; Oprd1	165195	U10504	1p36.1-p34.3
		Opioid Receptor, Sigma 1	826109	U75283	****
		opioid binding cell adhesion			
		molecule/OBCAM	600632	****	Chr.11
		G protein-coupled receptor 7/GPR7	600730	U22491	0q11.2-q21.1
		G protein-coupled receptor 8/GPR8	600731	U22492	20q13.3
Lentin	Biosynthesis leptin/LEP	leptin/LEP	164160	164160 NM_000230	7q31.3
	Receptor	leptin receptor/LEPR	601007	601007 NM_002303	1p31
Cholecystoki	Biosynthesis	Cholecystokinin/CCK	118440	L00354	3pter-p21
nin (CCK)	Recentors	Cholecystokinin A receptor/CCKAR	118444	L13605	4p15.2-p15.1
	4	Cholecystokinin B receptor/CCKBR	118445	L08112	1p15.5-p15.4
		Neurokinin A/Tachykinin 1 or	0000	000001	
Tachykinin	Biosynthesis	Biosynthesis 2/Substance P or K	102320	676/50	7q21-q22
or Substance		Neurokinin B/Tachykinin 3	162330	***	12q13-q21
Por		Tachykinin NK1 receptor/TACR1	162323	M81797	Chr.2
Neurokinin	Receptors	Tachykinin NK2 receptor/TACR2	162321	M57414	10q11-q21
		Tachykinin NK3 receptor/TACR3	162332	M89473	***
	Biosynthesis	kininogen/KNG	228960	* * * *	3927
		kallikrein 1/KLK1	147910	AH002853	AH002853 9q13.2-q13.4

113503 N 113503 N 168470 N 168450 N 168450 N 168468 N 601469 N 176830 N 155555 N 155541 N 6000424 6000424 600424 600424 602469 601509 601509 601509			Lunday Linin maconton D1/DDVDD1			
Receptor bradykinin receptor B2/BDKRB2 G protein-coupled parathyroid hormone-related parathyroid hormone-related parathyroid hormone-related parathyroid hormone-related parathyroid hormone receptor parathyroid hormone receptor parathyroid hormone receptor parathyroid hormone receptor melanocortin 1 receptor/MC1R melanocortin 2 receptor/MC2R melanocortin 2 receptor/MC2R melanocortin 4 receptor/MC3R melanocortin 5 receptor/MC4R melanocortin 5 receptor/MC4R melanocortin 5 receptor/MC4R melanocortin 6 receptor Gamma/FOLR1 Folate Receptor Gamma/FOLR2 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1)  Transporter Vitamin B12 binding protein Gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/DHFR	Bradvkinin		Diadykiiiii jecepioi bi/bDNNbi o			
Hyroid Biosynthesis protein-coupled parathyroid hormone-related protein-coupled parathyroid hormone-related protein/parathyroid hormone-like hormone/PTHLH parathyroid hormone receptor melanocortin 1 receptor/MC1R melanocortin 2 receptor/MC1R melanocortin 2 receptor/MC2R melanocortin 5 receptor/MC4R melanocortin 5 receptor/MC5R Folate Receptor Apha/FOLR1  Receptors Folate Receptor Apha/FOLR1 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1)  Transporter Vitamin B12 binding protein Gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/DHFR	Di auy Kinin	ć	protein-coupled	600337	NM_000710	4q32.1-q32.
hyroid Biosynthesis hormone-related parathyroid hormone-related protein/parathyroid hormone-like hormone protein/parathyroid hormone receptor parathyroid hormone receptor parathyroid hormone receptor parathyroid hormone receptor and melanocortin 1 receptor (alpha melanocortin 2 receptor/MC1R melanocortin 2 receptor/MC2R melanocortin 4 receptor/MC4R melanocortin 5 receptor/MC5R Folate Receptor Beta/FOLR1  Receptors Folate Receptor Beta/FOLR2 Folate Receptor Beta/FOLR3 Folate Receptor Beta/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Beta/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1) Withylengtetrahydrofolate Methylenetetrahydrofolate Folate Architese/MTHFR Dihydrofolate reductase/DHFR		Keceptor	bradykinin receptor B2/BDKRB2 G			
hyroid Biosynthesis hormone-related protein/parathyroid hormone-like hormone/PTHLH  Receptors parathyroid hormone receptor parathyroid hormone receptor melanocortin receptor/MC1R melanocortin 2 receptor/MC2R melanocortin 2 receptor/MC2R melanocortin 4 receptor/MC4R melanocortin 5 receptor/MC3R Folate Receptor Beta/FOLR1  Receptors Folate Receptor Beta/FOLR2 Folate Receptor Beta/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Beta/FOLR3 Folate Receptor Beta/FOLR3 Folate Receptor Beta/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1) Transporter Vitamin B12 binding protein Glutaminati folylpolyglutamate synthetase/FPGS on gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate Foliate Receptor Beta/FOLR3 Bamma-glutamyl hydrolase/GGH Dihydrofolate reductase/DHFR			protein-coupled	113503	NM_000623	4q32.1-q32.
hyroid Biosynthesis hormone/PTHLH  Receptors parathyroid hormone receptor parathyroid hormone receptor parathyroid hormone receptor parathyroid hormone receptor melanocortin melanocortin 1 receptor (alpha melanocortin 2 receptor/MC1R melanocortin 2 receptor/MC2R melanocortin 5 receptor/MC2R melanocortin 5 receptor/MC4R melanocortin 6 receptor/MC3R Folate Receptor Alpha/FOLR1  Receptors Folate Receptor Alpha/FOLR2 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1) Vitamin B12 binding protein Glutaminati folylpolyglutamate synthetase/FPGS on gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/MTHFR			parathyroid hormone-related		MM 00282	12n121_
Receptors   Parathyroid hormone/PTH	7		protein/parathyroid hormone-like	168470	70700 TAINI	12012.1-
Parathyroid hormone/PTH	Parathyroid		hormone/PTHLH		Ο	p11.4
Receptors Biosynthesis proopiomelanocortin melanocortin 1 receptor (alpha melanocortin 2 receptor/MC1R melanocortin 2 receptor/MC2R melanocortin 3 receptor/MC4R melanocortin 5 receptor/MC5R Folate Receptor Alpha/FOLR1  Receptors Folate Receptor Alpha/FOLR1 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Pransporter (SLC19A1) Transporter Vitamin B12 binding protein Glutaminati folylpolyglutamate synthetase/FGS on Methylenetetrahydrofolate reductase/MTHFR Dihydrofolate reductase/DHFR	Hormone		parathyroid hormone/PTH	168450	NM_000315	1p15.3-p15.
Hiosynthesis proopiomelanocortin melanocortin 1 receptor (alpha melanocortin 1 receptor (alpha melanocortin 2 receptor)/MC1R melanocortin 2 receptor/MC2R melanocortin 4 receptor/MC4R melanocortin 5 receptor/MC4R melanocortin 5 receptor/MC5R Folate Receptor Beta/FOLR1 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1)  Transporter Vitamin B12 binding protein Glutaminati folylpolyglutamate synthetase/FGS on gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/MTHFR	(Р1Н)		parathyroid hormone receptor	168468	NM_000316	3p22-p21.1
Heceptor (alpha melanocortin I receptor (alpha melanocortin I receptor (alpha melanocortin I receptor/MC1R melanocortin 2 receptor/ACTH receptor/MC2R melanocortin 4 receptor/ACTH melanocortin 5 receptor/ACTH Folate Receptor Beta/FOLR1 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1)  Transporter Vitamin B12 binding protein Glutaminati folylpolyglutamate synthetase/FGS on gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/DHFR		Keceptors	parathyroid hormone receptor	601469	NM_005048	2q33
melanocyte stimulating hormone receptor)/MC1R melanocortin 2 receptor/ACTH receptor/MC2R melanocortin 4 receptor/MC4R melanocortin 5 receptor/MC5R Folate Receptor Alpha/FOLR1 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1) Transporter Vitamin B12 binding protein Vitamin B12 binding protein Glutaminati folylpolyglutamate synthetase/FPGS on gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/MTHFR		Biosynthesis	proopiomelanocortin	176830	NM_000939	2p23.3
Transporter  Clutaminati  Clutaminati  CIH  Receptor/MC1R  Receptor/MC2R  Receptor/MC2R  Receptor/MC4R  Receptor  Receptor/MC5R  Receptor  Folate Receptor Alpha/FOLR1  Folate Receptor Beta/FOLR2  Folate Receptor Gamma/FOLR3  Folate Receptor Gamma/FOLR3  Folate Receptor Gamma/FOLR3  Folate Transporter (SLC19A1)  Vitamin B12 binding protein  Glutaminati folylpolyglutamate synthetase/FPGS  on gamma-glutamyl hydrolase/GGH  Methylenetetrahydrofolate  reductase/MTHFR  Dihydrofolate reductase/DHFR			melanocortin 1 receptor (alpha			
receptor)/MC1R melanocortin 2 receptor/ACTH receptor/MC2R melanocortin 4 receptor/MC4R melanocortin 5 receptor/MC5R Receptor Folate Receptor Alpha/FOLR1 Folate Receptor Beta/FOLR2 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1) Transporter Vitamin B12 binding protein On gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/MTHFR Dihydrofolate reductase/DHFR			melanocyte stimulating hormone			
melanocortin 2 receptor/ACTH receptor/MC2R melanocortin 4 receptor/MC4R melanocortin 5 receptor/MC5R melanocortin 5 receptor/MC5R Folate Receptor Alpha/FOLR1 Folate Receptor Beta/FOLR2 Folate Receptor Gamma/FOLR3 Folate Receptor Gamma/FOLR3 Folate Transporter (SLC19A1) Vitamin B12 binding protein Vitamin B12 binding protein Glutaminati folylpolyglutamate synthetase/FPGS on gamma-glutamyl hydrolase/GGH Methylenetetrahydrofolate reductase/MTHFR Dihydrofolate reductase/DHFR			receptor)/MC1R	155555	NM_002386	16q24.3
	ACTH		melanocortin 2 receptor/ACTH			
			receptor/MC2R	202200	NM_000529	18p11.2
			melanocortin 4 receptor/MC4R	155541	NM_005912	18q22
		Receptor	melanocortin 5 receptor/MC5R	600042	NM_00591 3	18p11.2
			Folate Receptor Alpha/FOLR1	136430	M28099	1q13.3-q13.
		Receptors	Folate Receptor Beta/FOLR2	136425	AF000380	1q13.3-q13.5
			Folate Receptor Gamma/FOLR3	602469	Z32564	****
		E	Folate Transporter (SLC19A1)	600424	U19720	21q22.3
136510 601509 236250 126060	-	i ransporter	Vitamin B12 binding protein	275350	NM_000355	22q11.2-qter
gamma-glutamyl hydrolase/GGH 601509 Methylenetetrahydrofolate reductase/MTHFR 236250 Dihydrofolate reductase/DHFR 126060		Glutaminati	folylpolyglutamate synthetase/FPGS	136510	M98045	9cen-q34
236250		00	gamma-glutamyl hydrolase/GGH	601209	US5206	****
236250			Methylenetetrahydrofolate			
126060			reductase/MTHFR	236250	U09806	1p36.3
	W7		Dihydrofolate reductase/DHFR	126060	J00140	5q11.2-q13.2

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		5,10-methylenetetrahydrofolate			
		dehydrogenase, 5,10-			-
		methylenetetrahydrofolate			-
		cyclohydrolase, 10-		·	
		formyltetrahydrofolate		····	
		synthetasc/MTHFD1	172460	172460 NM_005956	14q24
		5,10-methenyltetrahydrofolate			į
		synthetase (5-formyltetrahydrofolate			
Folate		cyclo-ligase)/MTHFS	604197	604197 NM 006441	Chr. 15
Metabolism		phosphoribosylglycinamide			
		formyltransferase,			
		phosphoribosylglycinamide			
	Motobolism	synthetase,			
	MICLADONSIN	phosphoribosylaminoimidazole	138440	138440 NM 000819	21022.1
		folate hydrolase 1/FOH1	600934	600934 NP 004467	1
		6-pyruvoyl tetrahydrobiopterin			
		synthase/PTPS	261640	Q03393	.1q22.3-q23.
		serine hydroxymethyltransferase 1			
		(soluble)/SHMT1	182144	182144 NM_004169	17p11.2
	•	serine hydroxymethyltransferase 2			
		(mitochondrial)/SHMT2	138450	138450 NM 005412	12q13
		Glycine aminotransferase/glycine			
		cleavage T protein/GAT	238310	238310 NM 000481 Bp21.2-p21.	3p21.2-p21.
		5-methyltetrahydrofolate-			
		homocysteine			
•		methyltransferase/methionine	156570	156570 NM_000254	1943
		glutamate			
		formiminotransferase/dihydrofolate			
		synthetase	229100	****	****

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			hypoxanthine-guanine			
			phosphoribosyltransferase	308000	M31642	Xq26-q27.2
			adenosine		NM_00048	
			phosphoribosyltransferase/APRT	102600	S	16924
General Cell			·		NM_00036	
Growth			thiopurine S-methyltransferase/TPMT	187680	7	6p22.3
			IMP (inosine monophosphate)		NM_00088	ı
			dehydrogenase 1/IMPDH1	146690	3	7q31.3-q32
			IMP (inosine monophosphate)		88000 WN	
			dehydrogenasc 2/IMPDH2	146691	4	3p21.2
	Purine	Purine			NM 00112	
	Metabolism	Metabolism	adenylosuccinate synthetase/ADSS	103060	6	1cen-q12
					NM_00002	
	٠		adenylosuccinate lyase	103050	9	22q13.1
			glycinamide ribotide formyltransferase   138440	138440	X54199	21q22.1
			urate oxidase	191540	AH003594	1p22
					NM_00027	
			purine nucleoside phosphorylase	164050	0	14q13.1
					NM_00037	
			xanthine oxidase	278300	6	2p23-p22
					NM_00002	
			adenosine deaminase	102700	2	20q13.11
			beta tubulin/TUBB	191130	6 90100 MN	6p21.3
					80900 WN	
			beta tubulin 2/TUBB2	602660	8	*****
	Cytoskeleton	Tubulin	beta tubulin 4/TUBB4	602661	NM_00608 6	****
			beta tubulin 5/TUBB5	602662	NM_00608	***
		_		_	-	•

		<del></del>			NM 00107	
superoxide dismutase 1/SOD1 147450 4  superoxide dismutase 2, mitochondrial/SOD2 147460 X65965 thioredoxin-dependent peroxide 600538 9 peptide methionine sulfoxide 601250 ******  Oxygen  Stress lipoprotein, Lp(a)/LPA 152200 7 succinate dehydrogenase complex, subunit C, integral membrane 602413 1 glucose-6-phosphate 602413 1 glucose-6-phosphate 602413 305900 2 dehydrogenase/G6PD (mitochondrial) 305900 2 aldehyde oxidase 1/AOX1 602841 9			gamma tubulin/TUBG	191135	0_	****
Oxygen         Vertical dismutase 1/SOD1         147450         4           Stress         147460         X65965           thioredoxin-dependent peroxide         147460         X65965           thioredoxin-dependent peroxide         NIM_00580           reductase/TDPX1         600538         9           peptide methionine sulfoxide         601250         ********           reductase/MSRA         601250         ********           succinate dehydrogenase complex, subunit C, integral membrane         NIM_00300           protein/SDHC         602413         1           glucose-6-phosphate         NIM_00040         2           dehydrogenase/G6PD (mitochondrial)         305900         2           aldehyde oxidase 1/AOX1         602841         9					NM_00045	
superoxide dismutase 2, mitochondrial/SOD2 thioredoxin-dependent peroxide thioredoxin-dependent peroxide treductase/TDPX1 peptide methionine sulfoxide reductase/MSRA Oxygen Stress lipoprotein, Lp(a)/LPA succinate dehydrogenase complex, subunit C, integral membrane protein/SDHC glucose-6-phosphate glucose-6-phosphate dehydrogenase/G6PD (mitochondrial) aldehyde oxidase 1/AOX1 subunit C, integral membrane glucose-6-phosphate glucose-6-phosphate dehydrogenase/G6PD (mitochondrial) subunit C, integral membrane protein/SOHC glucose-6-phosphate glucose-6-phosphate glucose-6-phosphate glucose-6-phosphate glucose-6-phosphate glucose-6-phosphate glucose-6-phosphate glucose-6-phosphate glucose-6-phosphate			superoxide dismutase 1/SOD1	147450	4	21q22.1
thioredoxin-dependent peroxide thioredoxin-dependent peroxide reductase/TDPX1 peptide methionine sulfoxide reductase/MSRA  Oxygen Stress lipoprotein, Lp(a)/LPA succinate dehydrogenase complex, subunit C, integral membrane protein/SDHC glucose-6-phosphate dehydrogenase/G6PD (mitochondrial) 305900 2 aldehyde oxidase 1/AOX1  MM_00115			superoxide dismutase 2,			
thioredoxin-dependent peroxide 600538 NM_00580 reductase/TDPX1  Oxygen Stress lipoprotein, Lp(a)/LPA succinate dehydrogenase complex, subunit C, integral membrane protein/SDHC glucose-6-phosphate dehydrogenase/G6PD (mitochondrial) 305900 dehydrogenase/G6PD (mitochondrial) 305900 aldehyde oxidase 1/AOX1  NM_00115			mitochondrial/SOD2	147460		6q25.3
Oxygen         reductase/TDPX1         600538         9           Oxygen         reductase/MSRA         601250         ******           Stress         lipoprotein, Lp(a)/LPA         152200         7           succinate dehydrogenase complex, subunit C, integral membrane         NM_00300           protein/SDHC         602413         1           glucose-6-phosphate         NM_00040         2           dehydrogenase/G6PD (mitochondrial)         305900         2           aldehyde oxidase 1/AOX1         602841         9			thioredoxin-dependent peroxide		NM_00580	
Oxygenreductase/MSRA601250******OxygenNM_00557Stresslipoprotein, Lp(a)/LPA1522007succinate dehydrogenase complex, subunit C, integral membrane protein/SDHCNM_00300protein/SDHC6024131glucose-6-phosphateNM_00040dehydrogenase/G6PD (mitochondrial)3059002aldehyde oxidase 1/AOX16028419			reductase/TDPX1	600538	6	13q12
Oxygen         reductase/MSRA         601250         ******           Stress         lipoprotein, Lp(a)/LPA         152200         7           succinate dehydrogenase complex, subunit C, integral membrane protein/SDHC         NM_00300           glucose-6-phosphate dehydrogenase/G6PD (mitochondrial)         305900         2           aldehyde oxidase 1/AOX1         602841         9	Oxygen		peptide methionine sulfoxide			
Stress lipoprotein, Lp(a)/LPA 152200 7 succinate dehydrogenase complex, subunit C, integral membrane 602413 1 glucose-6-phosphate 602413 1 glucose-6-phosphate NM_00040 dehydrogenase/G6PD (mitochondrial) 305900 2 aldehyde oxidase 1/AOX1 602841 9	Stress		reductase/MSRA	601250		***
succinate dehydrogenase complex, subunit C, integral membrane protein/SDHC glucose-6-phosphate dehydrogenase/G6PD (mitochondrial) 305900 aldehyde oxidase 1/AOX1    152200   7   NM_00300   1   NM_00040   2   NM_00115   9	(additional	Oxygen			NM_00557	
subunit C, integral membrane protein/SDHC glucose-6-phosphate dehydrogenase/G6PD (mitochondrial) 305900 aldehyde oxidase 1/AOX1 subunit C, integral membrane 602413 1 NM_00040 2 NM_00115	genes in	Stress	lipoprotein, Lp(a)/LPA	152200	7	6q27
ondrial) 305900 NM_00115 NM_00115	Toxicology)		succinate dehydrogenase complex,			
tochondrial) 305900 2 NM_00115 602841 9	•		subunit C, integral membrane		NM_00300	
tochondrial) 305900 2 NM_00115 602841 9			protein/SDHC	602413	Ţ	1921
tochondrial) 305900 2 NM_00115 602841 9			glucose-6-phosphate		NM_00040	
NM_00115 602841 9			dehydrogenase/G6PD (mitochondrial)	305900	2	Xq28
602841 9			-		NM_00115	
			aldehyde oxidase 1/AOX1	602841	6	2q33

		Table 5. N	Table 5. Meatbolism and Endocrinology Gene List	ist		
Class	Pathway	Function Name	Name	ОМІМ	CID	Locus
			membrane			
			metalloendopeptidase/neutral	120520	120520 NM_000902 3q21-q27	3q21-q27
			calpain, large polypeptide L3/CAPN3   114240 NM_000070 5q15.1-q21.1	114240	NM_000070	5q15.1-q21.
			leucyl/cystinyl	151300	151300 NM 005575	****
			carboxypeptidase N polypeptide			
			1/CPN1	603103	503103 NM_001308 chr. 10	chr. 10

			carboxypeptidase N polypeptide 2/regulatory subunit/CPN2	603104	J05158	8p23-p22
General	Pentide	Drotonee	meprin alpha subunit/MEP1A	600388	600388 NM_0059256p21.2-p21	6p21.2-p21.1
Metabolism	Hormone	and Protesse	carboxypeptidase E/CPE	114855	114855 NM_001873	Chr.4
for Peptide	Processing	Inhihitore	tubby (mouse) homolog/TUB	601197	601197 NM_003320	11p15.5
Hormones	guiseano i	SIOMOTOR	meprin beta subunit/MEP1B	600389	600389 NM_005925 8q12.2-q12	8q12.2-q12.3
			prolyl endopeptidase/PREP	600400	600400 NM 002726	6q22
			neuroendocrine convertase			
			1/NEC1/proprotein convertase			
			subtilisin/kexin type 1/PCSK1	162150	162150 NM_000439	5q14-q21
			peptidylglycine alpha-amidating			
			monooxygenase /PAM/NEC2	170270	170270 NM_000919	5q14-q21
			paired basic amino acid cleaving			
	-		enzyme/PACE/FUR	136950	NM_002569	15q25-q26
			serotonin N-Acetyltransferase/SNAT	056009	U40347	17q25
		ı	X-chromosomal acetylserotonin N-			
			methyltransferase/ASMT	300015	NM_004043	300015 NM_004043 Xpter-p22.32
			Y-chromosomal acetylserotonin N-			
	Circadian	Moloton	methyltransferase/ASMT	402500	****	Ypter-p11.2
	Regulation	Meiatomin	acetylserotonin N-methyltransferase-			
			like/ASMTL	300162	300162 NM_004192Xpter-p22.32	Xpter-p22.32
			melatonin receptor 1A/MTNR1A	99009	600665 NM_005958	4q35.1
			melatonin receptor 1B/MTNR1B	600804	600804 NM_005959	11q21-q22
			tryptophan 2,3-dioxygenase/TDO2	191070	191070 NM_005651	4q31-q32
			corticotropin releasing hormone/CRH	122560	NM_000756	8q13
			urocortin/UCN	600945	NM_003353	Chr.2
			urocortin 2/UCN2	604097	AF104118	**
			Corticotropin releasing hormone			
	A A	CRH	receptor 1/CRHR1	122561	U16273	17q12-q22
			e e e e e e e e e e e e e e e e e e e			
			Line of Control of Con			
			4czf01_xis			ď
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M. 70 C. 1 C.					
יייייייייייייייייייייייייייייייייייייי		Corticotropin releasing hormone			
otropic		receptor 2/CRHR2	602034	602034 NM_001883	7p21-p15
normone		Corticotropin releasing hormone-			
		binding protein/CRHBP	122559	122559 NM_0018825911.2-913.3	5q11.2-q13.
		proopiomelanocortin/POMC	176830	176830 NM_000939	2p23.3
	ACTH	melanocortin 2 receptor/ACTH			
		receptor/MC2R	202200	202200 NM_000529	18p11.2
		thyrotropin releasing hormone/TRH	275120	275120 NM_007117	3р
	TRH	thyrotropin releasing hormone			
		receptor/G protein coupled/TRHR	188545	188545 NM_003301	8q23
		cAMP responsive element binding	133010	NM_00437	70000
		protein 1/CREB1	010671	6	4ch-c.7ch7
		chorionic gonadotropin alpha			
	Ten	chain/TSHA/CGA	118850	118850 NM_000735	6q21.1-q23
	ucı	thyroid stimulating hormone beta			
		chain/TSHB	188540	188540 NM 000549	1p13
		thyroid stimulating hormone			
		receptor/TSHR	603372	603372 NM 000369	14q31
		solute carrier family 5 (sodium iodide	601843	K01843 NM_00045	51
		symporter), member 5/SLC5A5	2100	3	p12
		thyroid peroxidase (nuclear gene	274500	274500 NM_00054	3000
		encoding mitochondrial protein)/TPO	714200	7	C242
-		Their delivery	057881	NM_00323	8q24.2-
		uryrogrodum r G	100400	5	q24.3
		thyroxin-binding globulin/TBG	314200	314200 NM_00035	Xq22.2
Thyroid		transthyretin (prealbumin, amyloidosis	1	NM 00037	18a11.2-
Hormone	-	type I)/TTR			q12.1

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		deiodinase, iodothyronine, type VDIO1	147892	NM_00079	1p33-p32
	Thyroid	deiodinase, iodothyronine, type II/DIO2	601413	NM_00079	14q24.2- q24.3
	Hormone Synthesis	thyroid hormone receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) 190120 oncogene homolog)/THRA	190120	NM_00325	
		thyroid hormone receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog 2)/THRB	190160	S57224	3p24.3
		thyroid hormone receptor coactivating protein/SMAP	601836	09900_MN 6	***
·		silencing mediator for retinoid and thyroid hormone receptors/SMRT	600848	600848 NM_006312	***
		retinoic and thyroid hormone receptor			
		1/TRACI/NCORI	600849	600849 NM_006311	****
		deiodinase, iodothyronine, type III/DIO3	601038	NM_00136 2	14q32
	GNRH	gonadotropin releasing hormone I/LHRH/GNRH1	152760	152760 NM_000825 8p21-p11.2	8p21-p11.2
<u> </u>	all		602352	602352 NM_001501	20p13
	s except CGH)	gonadotropin releasing hormone receptor/G protein-	030061	03000	
11	Prolactin	prolactin/PRL	176760	176760 NM_0009486p22.2-p21.3	4q41.2 p22.2-p21.3
		prolactin receptor/PRLR	176761	176761 NM_000949 5p13-p12	5p13-p12

Peptide Hormones Control of Metabolism 4czf01 .xls

		cAMP responsive element binding protein 1/CREB1	123810	123810 NM_00437	2q32.3-q34
	Leuteinizing	glycoprotein hormones, alpha polypeptide/CGAa	118850	118850 NM 000735 6q21.1-q23	6q21.1-q23
	Hormone	leuteinizing hormone beta			
		polypeptide/LHB	152780	152780 NM_000894	19q13.32
		luteinizing			
		hormone/choriogonadotropin	152790	152790 NM_000233	2p21
		glycoprotein hormones, alpha			
		polypeptide/CGAa	118850	118850 NM_000735 6q21.1-q23	6q21.1-q23
100000000000000000000000000000000000000		follicle stimulating hormone-	136530	136530 AH002701	11p13
Gollauotropi G Hormones		inhibin, beta A (activin A, activin AB			
		alpha polypeptide)/INHBA	147290	147290 NM 002192	7p15-p13
		activin A receptor, type I/ACVR1	102576	102576 NM_001105	2q23-q24
		activin A receptor, type IB/ACVR1B	601300	601300 NM_004302	12q13
	To Missie	activin A receptor type II-like			
	rollicle Stimuloting	1/ACVRL1	601284	601284 NM_000020	12q11-q14
	Hormone	activin typell A receptor/ACVR2	102581	102581 NM_001616	****
		activin A receptor, type IIB/ACVR2B	602730	602730 NM_001106 3p22-p21.3	3p22-p21.3
		alpha-inhibin/INHA	147380	147380 NM_001106	2q33-q36
		beta-B inhibin/beta C inhibin/INHBC		601233 NM_005538	12q13.1
		follistatin/FST	136470	136470 NM_006350	5p14
		follicle stimulating hormone			
		receptor/FSHR	136435	136435 NM_000145	2p21-p16
		FSH primary response (LRPR1, rat)			
		homolog 1/FSHPRH1	300065	300065 NM_006733	Xq22
		glycoprotein hormones, alpha			
	(L)::()::():	polypeptide/CGAa	118850	118850 NM_000735 6q21.1-q23	6q21.1-q23

		Gonadotroni	Conadotroni chorionic gonadotropin, beta			
			polypeptide/CGB	118860	118860 NM_000737	7 19q13.32
		1	luteinizing			i
			hormone/choriogonadotropin	152790	152790 NM 000233	2p21
			3-hyd oxy-3-methylglutaryl-			l
			Coenzyme A synthase 1	142940	142940 NM 002130	5p14-p13
			HMGCoA reductase/HMGCR	142910	NM 000859	142910 NM 000859 5q13.3-q14
			squalene synthetase/amesyl-			
			diphosphate farnesyltransferase	184420	NM 004462	184420 NM 004462 8p23.1-p22
			steroid-5-alpha-reductase, alpha			
			polypeptide 1 (3-oxo-5 alpha-steroid			
			delta 4-dehydrogenase alpha			
			1)/SRD5A1	184753	184753 NM 001047	5p15
÷	•		steroid-5-alpha-reductase, alpha			
			polypeptide 2 (3-oxo-5 alpha-steroid			
			delta 4-dehydrogenase alpha			
			2)/SRD5A2	264600	264600 NM_000348	2p23
		Anabolism	steroidogenic acute regulatory	600617	600617 NM_00034	
			cytochrome P450, subfamily XIA			
			(cholesterol side chain	118485	118485 NM_00078	15923-924
			cleavage)/CYP11A			
	General		ferredoxin 1/FDX1	103260	103260 NM_00410	11922
	Steroid		cytochrome P450, subfamily XVII		0.000	
	Hormone		(steroid 17-alpha-hydroxylase),	202110	202110 NM_00010	10q24.3
	Metabolism		adrenal hyperplasia/CYP17		7	•

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(adaitional genes in Toxicology)		hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1	109715	109715 NM_00086	1p13.1
		hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2	201810	201810 NM_00019	1p13.1
		dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A <sub>il</sub>	125263	NM_00316	19q13.3
		estrogen-preferring	600043	600043 NM_005420	4q13.1
•		UDP glycosyltransferase 1/UGT1	191740	191740 NM_00107	
·	Catabolism	UDP glycosyltransferase family 2, member B4/UGT2B4	290009	600067 NM_00107	4q13
		UDP glycosyltransferase family 2, member B7/UGT2B7	600068	600068 NM_00107	1q14
		UDP glycosyltransferase 2 family, polypeptide B11/UGT2B11	603064	603064 NM_00107	***
		UDP glycosyltransferase family 2, member B15/UGT2B15	690009	000069 NM_00107	4q13
		UDP glycosyltransferase family 2, member B17/UGT2B17	601903	601903 NM_00107	1914
		hydroxy-delta-5-steroid dehydrogenase, 3 bota- and steroid	109715	109715 NM_00086	1p13.1
	Synthesis	delta-isomerase 1/HSD3B1		7	
		hydroxy-delta-5-steroid		OLOGO MIN	
<u>-</u>		dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2	201810	8 8	1p13.1

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. 1102	1001 2 000	6p12	***		15q21.1	6q25.1	149	11912	14q24.3	4a13.1				<b>Sp15</b>		9q22		15q23-q24		2p23		Xq11-q12	4013
264080 NM_00092	9	J04988	NM_00411		107910 NM_000103	133430 NM_00012\$	X99101	NM_004451	602167 NM_004452	600043 NM 005420				84753 NM 001047		264300 NM 000197	WM 00078	1	1	264600 NM 000348		313700 NM 000044	601903 NM 001077
264080	140571	140572	602623		107910	133430	601663	866109	602167	600043			-	184753		264300		118485		264600		313700	601903
progesterone receptor/PGR	heat shock 90-kD protein 1, alpha subunit/HSPCA	heat shock 90-kD protein 1, beta subunit/HSPCB	FK506-binding protein 5/FKBP5	cytochrome P450, subfamily XIX	(androgen aromatase)/CYP19	estrogen receptor 1/ESR1	estrogen receptor 2/ESR2	estrogen-related receptor	estrogen-related receptor beta/ESRRB	estrogen-preferring	steroid-5-alpha-reductase, alpha	polypeptide 1 (3-oxo-5 alpha-steroid	delta 4-dehydrogenase alpha	1)/SRD5A1	hydroxysteroid (17-beta)	dehydrogenase 3/HSD17B3	cytochrome P450, subfamily XIA	(cholesterol side chain	cleavage)/CYPIIA	steroid 5-alpha-reductase 2/SRD5A2	androgen receptor	(dihydrotestosterone receptor)/AR	UDP glycosyltransferase 2 family,  Catabolism polypeptide B17/UGT2B17
	ß	Keceptors			Synthesis		Receptors	4		Catabolism					Synthesis	•					I	Receptor	Catabolism
Progestins							Estrogens								-	-	Androgens	0		11			
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Steroid Hormones

		cytochrome P450, subfamily XXI			
		(steroid 21-hydroxylase)/CYP21	201910	X58902	6p21.3
		cytochrome P450, subfamily XIB			
	Synthesis	(steroid 18-beta-hydroxylase),			•
	election of	polypeptide 2/CYP11B2	124080	124080 NM_000498	8q21
		cytochrome P450, subfamily XIB			
		(steroid 11-beta-hydroxylase),			
		polypeptide 1/CYP11B1	202010	202010 NM_000497	8q21
		glucocorticoid receptor/GRL	138040	138040 NM_000176	5q31
		heat shock 70kD protein 1/HSPA1A	140550	140550 NM_005345	6p21.3
Clucocortico		heat shock 70kD protein-like			
steroids		1/HSPA1L	140559	140559 NM_005527	6p21.3
(cortisol		heat shock 70kD protein 1/HSPA1B	603012	603012 NM_005346	6p21.3
corticosteron	Docontor	heat shock 90-kD protein 1, alpha			
e)	ondanav	subunit/HSPCA	140571	****	1q21.2-q22
6	Cofactore	heat shock 90-kD protein 1, beta			
	6019700	subunit/HSPCB	140572	104988	6p12
		FK 506-binding protein 4			
	;	(59kD)/FKBP4	600611	600611 NM_002014	***
		mineralocorticoid			
		receptor/MCR/nuclear receptor			
		subfamily 3, group C, member	600983	600983 NM_000901	4q31.1
	Transport	corticosteroid binding globulin			
	andCataholis	and Catabolis precursor/CBG	122500	122500 NM_001756	14q32.1
	and Catabons	hydroxy-D-5-steroid dehydrogenase, 3			
		b- and steroid D-isomerase 2/HSD3B2 201810 NM_000198	201810	NM_000198	1p13.1
		cytochrome P450, subfamily XIB,			
		polypeptide 2 (steroid 11-b-			
		hydroxylase)/CYP11B2	124080	124080 NM_000498	8q21

			sodium channel, nonvoltage-gated 1			
	Mineralocort	Synthesis	alpha/SCNN1A	600228	600228 NM_001038	12p13
	(aldosterone,		sodium channel, nonvoltage-gated 1,	0.000		
	deoxycortico		beta (Liddle syndrome)/SCNN1B sodium channel, nonvoltage-gated 1	00/000	600 / 60 INM_000336 16p13-p12	16p13-p12
<del></del>	sterone)	-	gamma/SCNN1G	600761	600761 NM_001039 16p13-p12	16p13-p12
			mineralocorticoid			
			receptor/MCR/nuclear receptor			
		Receptor	subfamily 3, group C, member	600983	600983 NM_000901	4q31.1
		·	nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	*****
			oxysterol binding protein/OSBP	167040	167040 NM_002556	11q12-q13
	Mediators of	. •. •	sterol regulatory element binding			
	Steroid	Transcriptio	Transcriptio transcription factor 1/SREBF1	184756	184756 NM_004176	17p11.2
	Response	n Factors	sterol regulatory element binding			
-	action desired		transcription factor 2/SREBF2	600481	600481 NM_004599	22q13
			steroid receptor coactivator 1/SRC1	602691	602691 NM_003743	2p23
			steroid receptor RNA activator/SRA	603819	AF092038	Chr. 5
			5-hydroxytryptamine (serotonin)			
	Serotonin	Receptors	receptor 2C (G protein-			
Norman			coupled)/HTR2C	312861	312861 NM_000868	Xq24
Requision	Donamine	Becentors	dopamine receptor D1/DRD1	126449	126449 NM_000794	5935.1
of Appetite	Ammada a	sindaaas	dopamine receptor D2/DRD2	126450	126450 NM_000795	11923
la l	Noreninenhr		adrenergic, beta-2-, receptor,			
	ingandara	Receptors	surface/ADRB2	109690	109690 NM_000024	5q32-q34
			adrenergic, beta-3-, receptor/ADRB3	109691	109691 NM_000025	8p12-p11.2
		Biosynthesis	Biosynthesis Neuropeptide Y/NPY	162640	162640 NM_00090s	7p15.1
			Neuropeptide Y receptor Y1/NPY1R	162641	162641 NM_000909	4q31.3-q32
	Nauronantid		Neuropeptide Y receptor Y2/NPY2R	162642	162642 NM 000910	4q31
	- Namential	_				21,222

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e V (NPV)	Documentors	Neuropeptide Y receptor			
	s inidaasi	Y3/chemokine receptor	162643	X71635	2021
		10 day 1 day	20201	C01/V	
	:	Neuropeptide Y receptor Y5/NPY5R	602001	602001 NM 006174	4q31-q32
		Neuropeptide Y receptor Y6/NPY6R	601770	601770 NM_006173	5931
	Biosynthesis	Biosynthesis preprogalanin/GAL1	137035	L11144	1q13.3-q13.
Galanin		galanin receptor 1 (brain)/GALR1	600377	600377 NM 001480	JL
	Receptor	galanin receptor 2/GALR2	603691	603691 NM 003857	17q25.3
		galanin receptor 3 (brain)/GALR3	603692	603692 NM_0036142q12.2-q13.	2q12.2-q13.
		pro-melanin-concentrating			
		hormone/PMCH	176795	176795 NM 002674	12q23-q24
	Ricevnthesis				
Pro-Melanin			176793	****	5p14
Concentratin		pro-melanin-concentrating hormone-			
g Hormone		like 2/PMCHL2	176794	AF064698	5q12-q13
-		melanin-concentrating hormone			
	Receptors	receptro/MCHR/G protein-coupled			
		receptor 24/GPR24	601751	601751 NM 005297	22q13.3
<del></del>	Biosynthesis	proopiomelanocortin/POMC	176830	176830 NM_000939	2p23.3
		melanocortin 1 receptor (alpha			
		melanocyte stimulating hormone		· <u>·</u>	
Melanocorti	Recentors	receptor)/MC1R	155555	155555 NM_002386	16q24.3
u u	s roid	melanocortin 4 receptor/MC4R	155541	155541 NM_005912	18q22
, , , , , , , , , , , , , , , , , , ,		melanocortin 5 receptor/MC5R	600042	NM_00591 3	18p11.2
	Regulation	agouti (mouse)-signaling protein/ASIP 600201	600201	NM_00167	20q11.2
		cAMP responsive element binding protein 1/CREB1	123810	NM_00437 9	2q32.3-q34
•	•				

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	•	1			•	
		Biosynthesis	preproenkephalin		110000	
	Opioids		B/prodynorphin/PDYN	131340	131340 NM_006211k0pter-p12.21	Upter-p12.21
Pentide			preproenkephalin			
Hormonal			A/proenkephalin/PENK	131330	131330 NM_006211	8q23-q24
Regulation		Receptors	opioid receptor, kappa 1/OPRK1	165196	165196 NM_000912	8q11.2
of Appetite		Biosynthesis	Biosynthesis Cholecystokinin/CCK	118440	118440 NM_000729	3pter-p21
4	Cholecystoki	f	Cholecystokinin A receptor/CCKAR	118444	118444 NM_0007304p15.2-p15.1	tp15.2-p15.1
	nin (CCR)	Keceptors	Cholecystokinin B receptor/CCKBR	118445	118445 NM_000731 1p15.5-p15.4	1p15.5-p15.4
			corticotropin releasing hormone/CRH	122560	122560 NM_000756	8q13
		Biosynthesis	Biosynthesis urocortin/UCN	600945	600945 NM_003353	Chr.2
			urocortin 2/UCN2	604097	AF104118	***
	Adrenocortic		Corticotropin releasing hormone			
	otropic	Doggađeni	receptor 1/CRHR1	122561	U16273	17q12-q22
	Hormone	receptors	Corticotropin releasing hormone			
			receptor 2/CRHR2	602034	602034 NM_001883	7p21-p15
		III IS	Corticotropin releasing hormone-			
		Signaming	binding protein/CRHBP	122559	122559 NM_0018825q11.2-q13.3	5q11.2-q13.3
		Diogynthosis	adenylate cyclase activating			
		Diosymensis	polypeptide 1 (pituitary)/ADCYAP1	102980	102980 NM_001117	18p11
	PACAP		adenylate cyclase activating			
		Receptor	polypeptide 1 (pituitary) receptor type			
			VADCYAP1R1	102981	102981 NM_001118	7p14
	Enterostatin	Biosynthesis	enterostatin/colipase, pancreatic/CLPS		120105 NM_001832	6pter-p21.1
		Biosynthesis	insulin/INS	176730	176730 NM_000207	11p15.5
	umsarı	Receptor	insulin receptor/INSR	147670	147670 NM_000208	19p13.2
		-	leptin/LEP	164160	164160 NM_000230	7q31.3
		Biosynthesis	peroxisome proliferative activated			
			receptor, gamma/PPARG	601487	601487 NM_005037	3p25

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	Receptor	leptin receptor/LEPR	601007	601007 NM_002303	1p31
Leptin		signal transducer and activator of transcription 3/STAT3	102582	NM_00315 0	17q21
•		signal transducer and activator of	601511	NM_00315	170112
	Signalling	transcription 5A/STAT5A	116100	2	1/411.2
		signal transducer and activator of		31500 AUA	
		transcription 6, interleukin-4	601512	NIM_00515	12q13
		induced/STAT6		6	
	Biosynthesis	Biosynthesis thyrotropin releasing hormone/TRH	275120	275120 NM_007117	3p
Inyrold		thyrotropin releasing hormone			
TOURING	Receptors	receptor/G protein coupled/TRHR	188545	188545 NM_003301	8q23
·	Biosynthesis	paired box gene 6/PAX6	106210	NM_00028 0	11p13
		preproglucagon/GCG	138030	138030 NM_002054	2q36-q37
Glucagon		glucagon receptor/GCGR	138033	138033 NM_000160	17q25
	Receptor	glucagon-like peptide 1	138032	138032 NM_002062	6p21
		glucagon-like peptide 2	603659	603659 NM 004246	17p13.3
	Biosynthesis		106210	NM_00028 0	11p13
Glucagon-		preproglucagon/GCG	138030	138030 NM_002054	2q36-q37
Like Dolunentides		glucagon-like peptide 1	138032	138032 NM_002062	6p21
sanndad kin r	Receptors	glucagon-like peptide-2 receptor			
		precursor/GLP2R	603659	AF105367	17p13.3
		somatostatin transcription factor			
	-	1/STF1/homeodomain transcription			
	V	factor/insulin promoter factor 1/IPF1	600733	600733 NM_000209	13q12.1
		paired box gene 6/PAX6	106210	NM_00028 0	11p13
		paired box gene 4/PAX4	167413	167413 NM_006193	7q32

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				2 17 27 1		
			Homo sapiens paired box gene	16/415	16/415 NM_003466	2912-914
			insulin/INS	176730	176730 NM_000207	11p15.5
			neurogenic differentiation	601724	601724 NM_002500	2q32
			cAMP responsive element binding	123810	NM_00437	2q32.3-q34
					,	
			iim nomeobox transcription factor 1,			
		Diographosis	alpha/LIMX1A	600298	****	1q22-q23
Control of		Diosyminesis	caudal type homeo box transcription			
Metabolism			factor 2/CDX2	600297	600297 NM 001265	13q12.3
			purine-rich element binding protein			
			A/PURA	600473	600473 NM_005859	5q31
			ATP-binding cassette, sub-family C,		35000 JAIX	
			member 8/ABCC8/sulfonylurea	6002009	ccoop_mini	11p15.1
	•		receptor (hyperinsulinemia)/SUR1		7	•
	Insulin		ATP-binding cassette, sub-family C (C 601439 NM_005691	601439	NM_005691	12p12.1
			beta-cell inward rectifier			
			subunit/BIR/potassium inwardly-	600037	D50582	112151
			rectifying channel, subfamily J,	156000	790000	11013.1
			member 11/KCNJ11			
		,	carboxypeptidase E/CPE	114855	114855 NM_001873	Chr.4
			insulin receptor/INSR	147670	147670 NM_000208	19p13.2
			insulin receptor substrate 1/IRS1	147545	147545 NM_00554	2q36
			insulin receptor substrate 2/IRS2	767009	NM_00374 9	13q34
		Receptor	insulin receptor substrate 4/IRS4	603510	603510 NM_00360	*****
			growth factor receptor-bound protein 10/GRB10	601523	NM_00531 1	7p12-p11.2

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		-				
			growth factor receptor-bound protein 2/GRB2	108355	NM_00208 6	17q24-q25
		•	amylin/diabetes-associated			
		Signaling	peptide/DAP/islet ansyloid	147940	NM_00041	12p12.3-
			polypeptide/IAPP		\$	p12.1
	·	Metabolism		146680	146680 NM 004969	10q23-q25
			uncoupling protein 1 (mitochondrial,		ļ	
			proton carrier)/UCP1	113/30	X51953	4q31
į	٠	• ***	uncoupling protein 2 (mitochondrial,			
Thermoregul	Uncoupling	Uncoupling		601693	AF019409	11913
ation	Proteins	Proteins	uncoupling protein 3 (mitochondrial,			
			proton carrier)/UCP3	602044	602044 NM_003356	11913
-			uncoupling protein 4 (mitochondrial,			
			proton carrier)/UCP4	* * * *	***** NM 004277	****
			somatostatin transcription factor			
			1/STF1/homeodomain transcription			
			factor/insulin promoter factor 1/IPF1	600733	600733 NM 000209	13q12.1
		Biosynthesis		106210	NM_00028 0	11p13
		_	cAMP responsive element binding	123810	NM_00437	2a32.3-a34
	r		sometostatin/QCT	1001	6	
	Somatostatin		Somiatostatili 33 1	182420	182450 NM 001048	3q28
			preprocortistatin/CORT	602784	602784 NM 001302	1p36
			Somatostatin receptor 1/G protein-			
			coupled/SSTR1	182451	182451 NM_001049	14q13
			Somatostatin receptor 2SSTR2	182452	182452 NM 001050	17q24
		Receptors	Somatostatin receptor 3/adenyl cyclase			
			coupled/SSTR3	182453	182453 NM 001051	22q13.1
_			Somatostatin receptor 4/SSTR4	182454	182454 NM 001052	20p11.2

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GHRH   Growth hormone releasing   139190   AH002712	5		100,	000000000000000000000000000000000000000	
GHRH Growth Hormone Biosynthesis Receptor Regulation Catabolism	Solijatostatin recept	or 5/551K5	182455	182455 NM 001053	16p13.3
Growth Hormone Biosynthesis Receptor Regulation Catabolism	growth hormone rel	asing			
Growth Hormone Biosynthesis Receptor Catabolism	·		139190	AH002712	20q11.2
Growth Hormone Biosynthesis Receptor Regulation Catabolism		easing hormone			
Growth Hormone Biosynthesis Receptor Catabolism	receptor/G protein-c	oupled/GHRHR	139191	139191 NM_000823	7p15-p14
Hormone Biosynthesis Receptor Regulation Catabolism	,	omatotropin/GH1	139250	139250 NM 000515	11
Biosynthesis Receptor Regulation Catabolism	. 1	eptor/GHR	600946	600946 NM_000163	5p13-p12
Biosynthesis Receptor Regulation Catabolism	insulin-like growth	actor 1	077271	**********	12q22-
Receptor Regulation Catabolism		F1	14/440	ML2/344	q24.1
Receptor Regulation Catabolism	_	actor 2			
Receptor Regulation Catabolism	(somatomedin A)/IC	F2	147470	147470 NM 000612	11p15.5
Regulation Catabolism	insulin-like growth	actor 1 receptor			
Regulation			147370	147370 NM_000875	15q25-q26
Regulation		actor 2			
Regulation Catabolism	receptor/IGF2R		147280	147280 NM_000876	6q26
Regulation Catabolism	insulin-like growth f	actor binding prote	146730	MM_000596	7p14-p12
Regulation Catabolism	insulin-like growth f	actor binding prote	146731	M35410	2q33-q34
Regulation	insulin-like growth f	actor binding prote	146732	NM_000598	7p14-p12
	insulin-like growth f	actor binding prote	146733	Y12508	17q12-q21
		actor binding prote	146734	AF055033	2q33-q36
		actor binding prote	146735	M69054	12q13
	insulin-like growth f	actor binding prote	602867	NM_001553	4q12
	connective tissue gro	wth factor/CTGF/	121009	NM_001901	6q23.1
	insulin-like growth f	actor binding prote	602369	VIM_001554	1p22.3
	insulin-like growth f	actor binding prote	601489	NM_004970	Chr. 16
		IGF			
heparin-binding growth fa			602194	602194 NM_002775 0925.3-926.2	0q25.3-q26.
	heparin-binding grov	/th factor 1/FGF1	131220	131220 NM_000800	5q31
basic tibroblast growth fa	basic fibroblast growth factor/FGF2	th factor/FGF2	134920	134920 NM 002006	4q25-q27

Biosynthesis	h			
Biosynthesis		•		
Biosynthesis	et growth factor-related	64980	164980 NM_002008	11913
Biosynthesis	ist growin tactor - related			
Biosynthesis		65190	165190 NM_004464	4q21
Biosynthesis	fibroblast growth factor 6/FGF6	134921	XS7075	12p13
Biosynthesis	keratinocyte growth factor/fibroblast			
Biosynthesis		48180	148180 NM_002009 15q15-q21.1	15q15-q21.
Biosynthesis	fibroblast growth factor 8 (androgen-			
•		500483	600483 NM_006119	10q24
	fibroblast growth factor 9 (glia-			
		500921	600921 NM_002010	13q11-q12
	fibroblast growth factor 10/FGF10 6	502115	602115 NM_004465	5p13-p12
		501514	601514 NM_004112	17q21
	fibroblast growth factor 12/FGF12   6	601513	***	3428
		00000	300070 NM_004114	Xq26.3
	fibroblast growth factor 14/FGF14 6	501515	601515 NM_004115	13q34
		03724	603724 NM_003868	****
	fibroblast growth factor 17/FGF17 6	03725	603725 NM_003867	8p21
		03726	603726 NM_003862	*****
fibroblast growth facto	6	03891	603891 NM 005117	****
1/FGFR1	st growth factor receptor			8p11.2-
		136350	****	p11.1
fibroblast growth facto	fibroblast growth factor receptor 2			
(bacteria-expressed kinase,	a-expressed kinase,			
keratinocyte growth fa	keratinocyte growth factor receptor,			
craniofacial dysostosis	craniofacial dysostosis 1, Crouzon			
Receptors syndrome, Pfeiffer syn	syndrome, Pfeiffer syndrome, Jackson-		NM_00014	
Weiss syndrome)/FGFR2		176943	-	10q26

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			fibroblast growth factor receptor 3			
,			(achondroplasia, thanatophoric		NM 00524	٠
			dwarfism)/FGFR3	134934	7	4p16.3
			fibroblast growth factor receptor		NM 00201	•
			4/FGFR4	134935	,	5q35.1-qter
			FGFR1 oncogene partner/FOP	***	NM_007045	****
			suc1-associated neurotrophic factor			
			target 1 (FGFR signalling			
		Signaling	adaptor)/SNT1	***	***** NM 006654	****
			suc1-associated neurotrophic factor			
			target 2 (FGFR signalling			
			adaptor)/SNT2	****	***** NM_006653	****
			sonic hedgehog (Drosophila)			
General	Sonio	Riocynthesis		600725	600725 NM_000193	7q36
Growth	Hedgehog	Sicolar feora				
Control	90009000		hemolog/IHH	600726	L38517	2q33-q35
		Receptors	patched (Drosophila) homolog/PTCH	601309	601309 NM_000264	9q22.3
			nerve growth factor, alpha			
			subunit/NGFA	162020	***	***
	Nerve	Biosynthesis	nerve growth factor, beta	162030	****	1p13.1
	Growth		nerve growth factor; gamma			
	Factor		subunit/NGFG	162040	****	19q13.3
		Docentors	nerve growth factor receptor (TNFR			
		e ioidanav	superfamily, member 16)/NGFR	162010	162010 NM_002507	17q21-q22
			neurotrophin 3/NTF3	162660	162660 NM_002527	12p13
			neurotrophin 5 (neurotrophin	162662	162662 NM_006179	19q13.3
		Biosynthesis	neurotrophin 6, alpha/NTF6A	604021	604021 NM 004149	19q13.3
			neurotrophin 6, beta/NTF6B	604022	604022 NM 004150	19913.3
	Nourotronhi		neurotrophin 6, gamma/NTF6G	604023	604023 NM_004151	19q13.3

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ns		neurotrophic tyrosine kinase receptor			
1		type 1/NTRK1	191315	Y09033	1q21-q22
	December	neurotrophic tyrosine kinase receptor			
	veceptors	type 2/NTRK2	600456	600456 NM_006180	9q22.1
		neurotrophic tyrosine kinase receptor			
		type 3/NTRK3	191316	191316 NM_002530	15q25
		phosphatidylinositol 3-kinase,			
		regulatory subunit, polypeptide 1 (p85, 171833	171833	M61906	5q13
	•	alpha)/PIK3R1			
		phosphatidylinositol 3-kinase,		20300 YEA	
• • • • • •		régulatory subunit, polypeptide 2 (p85, 603157	603157	7	19415.2- q13.4
		nhosnhatidylinositol 3-kinasa			
•	Phosphatidy	Phosphatidyllregulatory subunit polymentide 3 (nest   ******   NM_00362	****	NM_00362	****
	Inositol	gamma)/PIK3R3		6	
	Kinases	phosphoinositide-3-kinase, catalytic,	, 00.0	NM 00621	
		alpha polypeptide/PIK3CA	1/1834		3q26.3
		phosphoinositide-3-kinase, catalytic,	30000	NM 00621	1 1 1
		beta polypeptidc/PIK3CB	C76700	6 6 676700	* * *
.;		phosphatidylinositol 3-kinase,	00000	NM_00502	1 2/0
		catalytic, delta polypeptide/PIK3CD	002039	9	1p50.2
		phosphatidylinositol 3-kinase,		NM 00264	1 1
		catalytic, gamma polypeptide/PIK3CG	001737	- 6	*
		son of sevenless (Drosophila)	107570	NM 00563	.000
		homolog 1/SOS1	182330	162330 3	17d-77d7
		v-Ha-ras Harvey rat sarcoma viral	190020	NM_00534	112155
		oncogene homolog/HRAS	2007.	3	11pij.j
-		v-Ki-ras2 Kirsten rat sarcoma 2 viral	190070	NM_00498	12,12,1
_	KAS/KAF	oncogene homolog/KRAS2	2,227	5	14014.1

Mediators neuroblaste	neuroblaste	neuroblastoma RAS viral (v-ras)	164790	NM_00252	1p13.2
Ras-related associated	Ras-related diabetes/RF	Ras-related associated with diabetes/RRAD	179503	NM_00416 5	16q22
v-raf-1 mur oncogene h	v-raf-1 mur oncogene h	v-raf-1 murine leukemia viral oncogene homolog 1/RAF1	164760	NM_00288 0	3p25
mitogen activated	mitogen ac PRKM1/N	mitogen activated protein kinase PRKM1/MAPK1	176948	NM_00274 5	22q11.2
mitogen activated PRKM3/MAPK3	mitogen ac PRKM3/N	mitogen activated protein kinase PRKM3/MAPK3	601795	X60188	16p11.2
mitogen activated PRKM4/MAPK4	mitogen ad PRKM4/N	mitogen activated protein kinase PRKM4/MAPK4	176949	NM_00274	18q12-q21
mitogen activated PRKM6/MAPK6	mitogen ac PRKM6/N	mitogen activated protein kinase PRKM6/MAPK6	602904	NM_00274 8	***
mitogen activated PRKM7/MAPK7	mitogen ac PRKM7/N	mitogen activated protein kinase PRKM7/MAPK7	602521	NM_00274 9	17p11.2
mitogen ac Protein JNK1/PRK	mitogen ac JNK1/PRK	mitogen activated protein kinase JNK1/PRKM8/MAPK8	601158	L26318	***
Kinases mitogen ac	mitogen ac JNK2/PRK	mitogen activated protein kinase JNK2/PRKM9/MAPK9	602896	U09759	5q35
mitogen ac JNK3/PRK	mitogen ac JNK3/PRK	mitogen activated protein kinase JNK3/PRKM10/MAPK10	602897	U35003	***
mitogen activated p	mitogen ac PRKM11/	mitogen activated protein kinase PRKM11/MAPK11	602898	AF031135	***
mitogen activated SAPK3/MAPK12	mitogen ac SAPK3/M/	mitogen activated protein kinase SAPK3/MAPK12	602399	NM_00296	22q13.3
mitogen activated pr PRKM13/MAPK13	mitogen ac PRKM13//	mitogen activated protein kinase PRKM13/MAPK13	602899	NM_00275 4	***
mitogen activated p	mitogen ac SAPK2A/h	mitogen activated protein kinase SAPK2A/MAPK14	600289	NM_00131	6p21.3- p21.2

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<del></del>		receptor type 1/PTPN1	176885	70700 TAINI	40413.1- q13.2
		protein tyrosine phosphatase, receptor type, F/PTPRF	179590	NM_00284 0	1p32
	Protein		176875	NM_00270 8	11q13
	r nospnatase S	phogrin/IAR/receptor-like protein- tyrosine phosphatase precursor/IAR	601698	AF007555	7q36
		protein tyrosine phosphatase, receptor type, N/PTPRN	601773	NM_00284 6	2q35-q36.1
		protein phosphatase 1, regulatory (inhibitor) subunit 2/PPP1R2	601792	NM_00624 1	3q29
	Other	insulin induced gene 1/INSIG1	602055	NM_00554 2	7q36
		pyruvate carboxylase/PC	266150	NM_00092 0	11q13.4- q13.5
· <u>-</u>		phosphoenolpyruvate carboxykinase 1 (soluble)/PEPCK1//PCK1	261680	NM_00259 1	20q13.31
	Gluconeogen	phosphoenolpyruvate carboxykinase 2 (mitochondrial)/PEPCK2/PCK2	261650	NM_00456 3	* * *
	212	aminomethyltransferase (glycine cleavage system protein T)/AMT	238310	NM_00048 1	3p21.2- p21.1
		(decarboxylating, glycine decarboxylase, glycine cleavage	238300	238300 NM_00017	9p22
		glycogenin/GYG	603942	NM_00413 0	3q24-q25.1
	Glycogen	glycogenin 2/GYG2	300198	NM_00391 8	Xp22.3

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D	glycogen synthase 1 (muscle)/GYS1	138570	138570 NM_00210	19q13.3
	glycogen synthase 1 (liver)/GYS2	138571	AJ003087	12p12.2
	(muscle), muscle	311870	NM_00263	l
	phosphorylase kinase, alpha 2 (liver),	306000	MN	Xp22.2-
	glycogen storage disease LX/PHKA2		2	p22.1
	phosphorylase kinase, beta/PHKB	172490	172490 NM 000293 16q12-q13.	16q12-q13.1
	phosphorylase kinase, gamma 2 (testis) 172471 NM_000294 6p12.1-p11.2	172471	NM_000294	6p12.1-p11.
	protein phosphatase, l, regulatory			
	(inhibitor) subunit 3 (glycogen and	600917	600917 NM_00271	****
	sarcopiasmic rencuium binding subunit, skeletal muscle)/PPP1R3		-	
	albumin proximal factor/transcription		NM 00054	
Regulation of Glycogen	ractor 1/1 CF1/hepatic nuclear factor/HNF1	142410	142410	12q24.2
M. 4. L				
Metabolism	transcription factor 2/TCF2/hepatic nuclear factor 2/HNF2	189907	NM_00648	17cen-q21.3
	hepatocyte nuclear factor 3, alpha/HNF3A	602294	NM_00449 6	14q12-q13
	hepatocyte nuclear factor-3 beta/HNF3B	600288	AF176110	20p11
	hepatocyte nuclear factor 3,	602295	602295 NM_00449	19q13.2-
	gamma/HNF3G	002200	7	q13.4
	hepatocyte nuclear factor 4,	600281	NM_00045	20q12-
	מוליות מווון שניין		,	913.1
	hepatocyte nuclear factor 6/HNF6	604164	AH007195	15q21.1- q21.2
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			insulin-regulated syntaxin 4 binding protein/SYNIP	* * *	* * * * *	***
			grucose-o-pnospnatase, uansport (glucose-6-phosphate) protein 1	602671	NM_00146	11923
	Metabolism		Solute carrier family 5, member 1/SLC5A1/SGLT1 (glucose)	182380	AH005284	22q13.1
		Uptake	Solute carrier family 2 (facilitated glucose transporter), member 1/SLC2A1/GLUT1 (glucose)	138140	NM_00651 6	1p35-p31.3
		•	Solute carrier family 2, member 2/SLC2A2/GLUT2 (glucose)	138160	***	3q26.1- q26.3
			Solute carrier family 2, member 3/SLC2A3/GLUT3 (glucose)	138170	M20681	12p13.3
			Solute carrier family 2, member 4/SLC2A4/GLUT4 (glucose)	138190	NM_00104	17p13
Carbohydrat e			Solute carrier family 2, member 5/SLC2A5/GLUT5 (glucose)	138230	NM_00303	1p36.2
Metabolism			phosphorylase, glycogen; muscle		07300 8414	
and Storage			(McArdle syndrome, glycogen storage disease type V)/PYGM	232600	232600 11111_00560	11913
			phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)/PYGL	232700	232700 NM_00286	14q21-q22
		Glycogen Breakdown	phosphorylase, glycogen; brain, nuclear gene encoding mitochondrial protein/PYGB	138550	138550 NM_00286	20p11.2- p11.1
			disease, glycogen storage disease type	232300	232300 NM_00015	17q25.2- q25.3

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amylo-1,6-glucosidase, 4-alph glucanotransferase (glycogen debranching enzymc, glycogen disease type III)/AGL hexokinase 2, nuclear gene enc mitochondrial protein/HK2 glucokinase (hexokinase 4, ma onset diabetes of the young 2) gene encoding mitochondrial protein/GCK phosphofructokinase, muscle/Fpyruvate kinase, liver/PKL pyruvate kinase, liver/PKL pyruvate dehydrogenase (lipoa alpha 1/PDHA1 pyruvate dehydrogenase (lipoa pyruvate dehydrogenase lipoylbeta-galactosidase/GLB1 cathepsin A/CSTA/protective p				
	e, 4-alpha- ycogen glycogen storage	32400	232400 NM_00064	1p21
	encoding	601125	NM_00018 9	2p12
	iaturity ) nuclear	138079	NM_00016	7p15-p13
	phosphofructokinase, muscle/PFKM 2.	232800	NM_00028 9	12q13.3
· · · · · · · · · · · · · · · · · · ·	pyruvate kinase, muscle/PKM2	79050	179050 NM_002654	15q22
		****	D13243	****
pyruvate dehydrogenase (lipoan pyruvate dehydrogenase (lipoan pyruvate dehydrogenase dihydrogenase dihydrogenase lipoylbeta-galactosidase/GLB1 cathepsin A/CSTA/protective p	pyruvate dehydrogenase (lipoamide) alpha 1/PDHA1	12170	312170 NM_00028	Xp22.2- p22.1
pyruvate dehydrogenase (lipoan pyruvate dehydrogenase dihydrogenase dihydrogenase lipoylbeta-galactosidase/GLB1 cathepsin A/CSTA/protective p	pyruvate dehydrogenase (lipoamide) all 179061 0	19061	NM_00539 0	4q22-q23
pyruvate dehydrogenase dihydrogenase dihydrogenase lipoylbeta-galactosidase/GLB1	pyruvate dehydrogenase (lipoamide) be 179060 S	09062	NM_00092 5	3p13-q23
pyruvate dehydrogenase lipoylbeta-galactosidase/GLB1	pyruvate dehydrogenase dihydrolipoam 24	46900	246900 NM_00010	7q31-q32
beta-galactosidase/GLB1 cathepsin A/CSTA/protective p	pyruvate dehydrogenase lipoyl-contain	45349	NM_00347	11p13
cathepsin A/CSTA/protective p	beta-galactosidase/GLB1	230500	M22590	3p21.33
	cathepsin A/CSTA/protective protein			
for beta-galactosidase	for beta-galactosidase			
(galactosialidosis)/PPGB		56540	256540 NM 000308	20q13.1

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			amyloid precursor protein			
		. "	secretase/cathepsin B/CTSB	116810	116810 NM 001908	8p22
			dipeptidyl-peptidase I/DPP1/cathepsin			
			C/CTSC	602365	602365 NM 001814 1q14.1-q14.3	1q14.1-q14.
			cathepsin D (lysosomal aspartyl			
			protease)/CTSD	116840	116840 NM_001909	11p15.5
	Clycolytic		cathepsin E/CTSE	116890	116890 NM_001910	
	(and Other)	Lyensomal	cathepsin F/CTSF	603539	AF132894	11913
	Protein	Taroeting of	cathepsin G/CTSG	116830	116830 NM_001911	14q11.2
	Maturation	Glycolytic	granzyme H/GZMH/cathepsin G-like			
	and	Enzymes	2/CSTGL2	116831		14q11.2
	Targeting		cathepsin H/CTSH	116820	116820 NM_004390	15q24-q25
	0		cathepsin K (pycnodysostosis)/CTSK	601105	601105 NM_000396	1921
			cathepsin L/CTSL	116880	116880 NM_001912	9q21-q22
			cathepsin L2/CTSL2	***	***** NM 001333	****
			cathepsin O/CTSO	600550	600550 NM_001334	4q31-q32
			cathepsin S/CTSS	116845	116845 NM_004079	1q21
			cathepsin U/CTSU	****	AF070448	***
			cathepsin V/CTSV	*****	AB001928	****
			cathepsin W/CTSW	602364	602364 NM 001335	11913.1
			cathepsin X precursor/CSTX	****	AF073890	****
			cathepsin Z/CTSZ	603169	603169 NM_001336	20q13
	•		mannosyltransferase polypeptide 1	603503	NM_00385	****
			actretrer prosmit (Past)		6	
			mannosyltransferase polypeptide 2	603564	NM_00386	***
			dolichyl-phosphate (UDP-N-			
			acetylglucosamine) N-	0101	NM 00138	,
			acetylglucosaminephosphotransferase	066161	7	11q23.3
			1 (GlcNAc-1-P transferase)/DPAGT1			

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		aldose reductase/aldo-keto reductase family 1, member A1 (aldehyde reductase)/AKR1A1	103880	NM_00606	7q35
Protein Glycosylatio	Sugar and	sorbitol dehydrogenase/SORD	182500	NM_00310 4	15q15.3
n (enzymatic and non-	Transition Metal	glutamine-fructose-6-phosphate transaminase 1/GFPT1	138292	NM_00205 6	2p13
enzymatic)	Metabolism	glutamine-fructose-6-phosphate transaminase 2/GFPT2	603865	NM_00511 0	5q34-q35
		receptor for advanced glycation end products/RAGE/AGER	600214	AJ133822	6p21.3
		glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	NM_00149	6p12
		glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
		ATP-binding cassette 7 (iron transporter)/ABCB7	300135	MN	Xq13.1- q13.3
		transferrin/TF	190000	190000 NM_00106	3q21
		hepatocyte growth factor/HGF	142409	142409 G_HUMHG	7q21.1
		hepatocyte growth factor	078771	NM_00024	Ċ
				NM 00337	1697
		factorVEGFA	192240	9	6p12
		vascular endothelial growth	601300	NM_00337	
		vascular endothelial orowth		NFA 00542	cipii
		factor/VEGFC	601528	2+coo_min	****
		VEGF receptor/VEGFR	191306	191306 AF063657	4q12

		Caronath to announce // // // //	130050	10000	
		growin normone/GH1	139230	139250 NM_000515 17922-924	1/q22-q24
		growth hormone receptor/GHR	600946	600946 NM 000163	5p13-p12
		pigment epithelium-derived	172860	172860 NM_002615	17p13.3
		angiostatin/plasminogen/PLG	173350	173350 NM_000301	6q26
		endostatin/type XVIII			
		collagen/COL18A1	120328	AF018081	21q22.3
		endothelin 1/EDN1	131240	131240 NM_001955	6p24-p23
		endothelin 2/EDN2	131241	131241 NM_001956	1p34
		endothelin 3/EDN3	131242	131242 NM_00011420q13.2-q13	20q13.2-q13.
		endothelin A receptor isoform delta			
	Vascular	3/EDNRA	131243	AF014826	Chr.4
Neovasculari	Growth	endothelin receptor type B/EDNRB	131244	131244 NM_000115	13922
zation	Factors and	protein kinase C beta/PRKCB	176970	X06318	16p11.2
	Inhibitors	transforming growth factor, beta-			
		1/TGFB1	190180	M60315	.9q13.1-q13.2
		transforming growth factor, beta-			
		2/TGFB2	190220	190220 NM_003238	1941
		transforming growth factor, beta-			
		3/TGFB3	190230	190230 NM 003239	14924
		transforming growth factor, beta		NIM 00461	
		receptor I (activin A receptor type II-	190181	NIM_00401	9q33-q34
		like kinase, 53kD)/TGFBR1		7	•
		transforming growth factor, beta		NM 00324	
		receptor II (70-80kD)/TGFBR2	190182	7	3p22
		naisionning grown factor, octa		NTA OD224	
		receptor III (betaglycan,	600742	3	1p33-p32
		decorin/DCN	125255	125255 NM_001920	12q23
		Munc13	****	AF020202	****

			transient receptor potential channel 3			
	•		(diacylglycerol-activated non-selective			
	• •		cation channel)/TRPC3		602345 NM 003305	****
			transient receptor potential channel 6			
			(diacylglycerol-activated non-selective			
			cation channel)/TRPC6	_	603652 NM_004621	11q21-q22
			solute carrier family 12, member			
	•	Ion Pump	3/SLC12A3 (renal sodium/chloride			
			transporter)	896009	600968 NM_000339	16q13
Hyperglycem			renin/REN	179820	179820 NM_000537	Xq28
ic Stress			renin-binding protein/RENBP	312420	312420 NM_002910	1q32
(hypoxia,	٠		angiotensinogen/AGT	106150	106150 NM_000029	1q42-q43
vascular			angiotensin II type 1 receptor/AGTR1	106165	M87290	3q21-q25
endothelium	•.	Angiotensin	guanine nucleotide binding protein (G			
thickening,			protein), beta polypeptide 3/GNB3	139130	139130 NM_002075	12p13
and	-		dipeptidyl carboxypeptidase 1			
hypertension)	•		(angiotensin I converting			
			enzyme)/ACE/DCP1	106180	106180 NM 000789	17q23
	• •		atrial natriuretic peptide precursor			
			ANPPA	108780	X01471	1p36.2
	•		atrial natriuretic peptide precursor			
-			B/NPPB	600295	****	1p36.2
	•		atrial natriuretic peptide precursor			
		Natriuretic	C/NPPC	600296	D28874	2q24-qter
		Peptide	natriuretic peptide receptor			
			A/ANPRA/NPR1	108960	* * * *	1q21-q22
			natriuretic peptide receptor			
			B/ANPRB/NPR2	108961	***	9p21-p12

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		natriuretic peptide receptor			
		C/ANPRC/NPR3	108962	108962 NM_000908	5p14-p12
		endothelin 1/EDN1	131240	131240 NM_001955	6p24-p23
		endothelin 2/EDN2	131241	131241 NM_001956	1p34
		endothelin 3/EDN3	131242	131242 NM_00011400q13.2-q13	.0q13.2-q13.2
	Endothelin	endothelin converting enzyme 1/ECE1	-	600423 NM_001397	1p36.1
		endothelin A receptor isoform delta			
7 7 10		3/EDNRA	131243	AF014826	Chr.4
Drocentro		endothelin receptor type B/EDNRB	131244	131244 NM_000115	13q22
Regulation	-	arginine vasopressin (neurophysin II,			
Cadditional		antidiuretic hormone, diabetes			<del></del> .
genes in		insipidus, neurohypophyseal)/AVP	192340	192340 NM_000490	20p13
Cardiovascul		arginine vasopressin receptor			
ar and	Voconroccin	1A/AVPR1A	600821	NM_000706	12q14-q15
Renal	v asopi essin	arginine vasopressin receptor			
		1B/AVPR1B	600264	600264 NM_000707	1q32
		arginine vasopressin receptor 2			
	-	(nephrogenic diabetes	304800	304800 NM_000054	Xq28
		leucyl/cystinyl	151300	151300 NM_005575	****
		nitric oxide synthetase 1/NOS1	163731	AH001515 2q24.2-q24.	2q24.2-q24.3
		nitric oxide synthetase 2A/NOS2A	163730	X85766	17cen-q11.2
	Nitric Oxide	Nitric Oxide macrophage nitric oxide synthetase			
	Pathway	2B/NOS2B	600719	AH006623   17p13.1-q25	17p13.1-q25
	(additional	macrophage nitric oxide synthetase			
	Genes in	2C/NOS2C	600720	600720	17p13.1-q25
	Cardiovascul	nitric oxide synthetase 3/NOS3	163729	AH001515	7q36
	ar and	chondrocyte nitric oxide synthetase			
	Renal)	3/NÖS4	163728	X73029	****
		arginase/ARG1	207800	207800 NM_000045	****
	•				

		arginase/ARG2	107830	107830 NM_001172 4q24.1-q24.	4q24.1-q24.
		ATP sensitive potassium inwardly-rectifying channel, subfamily J, member 5/KCNJ5	600734	NM_00089	11q24
		transient receptor potential channel 3 (diacylglycerol-activated non-selective cation channel)/TRPC3	602345	602345 NM_003305	*
	Ion Channels	transient receptor potential channel 6 (diacylglycerol-activated non-selective cation channel VTRPC6	603652	103652 NM 004621	11921-922
		potassium large conductance calcium-		1	
		activated channel, subfamily M, alpha member 1/KCNMA1	600150	600150 NM 002247	10q22
		potassium large conductance calcium-			
		activated channel, subfamily M, beta			
		member 1/KCNMB1	603951	603951 NM_004137	5q34
		superoxide dismutase 1/SOD1	147450	147450 NM_000454	21q22.1
	•	superoxide dismutase 2, mitochondrial/ 147460	147460	X65965	6q25.3
		glutamate-cysteine ligase (gamma- glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	NM_00149	6p12
-		glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
	Antiovidante	catalase/CAT	115500	115500 NM 001752	11p13
Amelioration	and Free		00000	2.00001	
of Oxidative	Radical	glutathione peroxidase 1/GPX1	138320	AF029317	3p21.3
Seans	Scavengers	giataminone peroxidase 2 (gastrointestinal)/GPX2	138319	1NIM_00208	14q24.1:

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Chlasmay/GPX3   13832    4		glutathione peroxidase 3		NM 00208	
glutathione peroxidase 4  (phospholipid hydroperoxidase)/GPX4 [13832] glutathione peroxidase 5 (epididymal androgen-related protein)/GPX5 (60343; apolipoprotein (a), Lp(a)/LPA [15220] RBP5/cellular retinoic acid-binding protein 1/CRABP1 [18023] retinol-binding protein 1, 18026[retinol-binding protein 3, interstitial/RBP3 [18029] retinol-binding protein 3, interstitial/RBP4 [18025] retinol-binding protein 4, interstitial/RBP4 [18025] Retinoic acid receptor, alpha/RARA [18024] Retinoic acid receptor, gamma/RARG [180196]		(plasma)/GPX3	138321	4	5q32-q33.1
glutathione peroxidase 5 (epididymal androgen-related protein)/GPX5 60343: apolipoprotein (a), Lp(a)/LPA 152200 RBP5/cellular retinoic acid-binding protein 1/CRABP1 18023 cellular retinoic acid-binding protein 1, cetinol-binding protein 1, retinol-binding protein 3, interstitial/RBP3 retinol-binding protein 3, interstitial/RBP4 18025 retinol-binding protein 3, interstitial/RBP4 18025 retinol-binding protein 3, interstitial/RBP4 18025 retinol-binding protein 4, interstitial/RBP4 18025 retinol-binding protein 6, interstitial/RBP4 18025 retinol-binding protein 7, interstitial/RBP4 18025 retinoic acid receptor, alpha/RARA 18024 Retinoic acid receptor, beta/RARB 18022C Retinoic acid receptor, gamma/RARG 180190		glutathione peroxidase 4		NM_00208	
glutathione peroxidase 5 (epididymal androgen-related protein)/GPX5 60343; apolipoprotein (a), Lp(a)/LPA 15220(RBP5/cellular retinoic acid-binding protein 1/CRABP1 18023(retinol-binding protein 1, retinol-binding protein 2, retinol-binding protein 3, interstitial/RBP4 18025(retinol-binding protein 4, interstitial/RBP4 18025(serum vitamin D-binding protein 6, interstitial/RBP4 18025(serum vitamin D-binding protein 7, retinol-binding component/GC 13920(transthyretin (prealbumin, amyloidosis 17630Ctransthyretin (prealbumin, amyloidosis 17630Ctransthyretin (component/GC 13920Ctransthyretin (component/GC 13920Ctrans		(phospholipid hydroperoxidase)/GPX4	138322		19p13.3
androgen-related protein)/GPX5 60343 apolipoprotein (a), Lp(a)/LPA 15220 RBP5/cellular retinoic acid-binding protein 1/CRABP1 18023 cellular retinoic acid-binding protein 1, 18023 retinol-binding protein 2, 18028 retinol-binding protein 3, 18029 retinol-binding protein 4, 18025 interstitial/RBP3 18025 serum vitamin D-binding protein 4, 18025 serum vitamin D-binding protein 6 protein/DBP/group-specific 13920 transthyretin (prealbumin, amyloidosis 17630 type 1)/TTR  Retinoic acid receptor, alpha/RARA 18022C Retinoic acid receptor, gamma/RARG 18019C		glutathione peroxidase 5 (epididymal		NM_00150	
apolipoprotein (a), Lp(a)/LPA 15220 RBP5/cellular retinoic acid-binding protein 1/CRABP1 18023 cellular retinoic acid-binding protein 1, retinol-binding protein 1, retinol-binding protein 3, interstitial/RBP3 18029 retinol-binding protein 3, interstitial/RBP4 18025 serum vitamin D-binding protein 4, interstitial/RBP4 18025 component/GC 13920C transthyretin (prealbumin, amyloidosis 17630C transthyretin (prealbumin, amyloidosis 17630C Retinoic acid receptor, alpha/RARA 18024C Retinoic acid receptor, gamma/RARG 18019C		androgen-related protein)/GPX5	603435	6	****
RBP5/cellular retinoic acid-binding protein 1/CRABP1 cellular retinoic acid-binding protein 2/CRABP2 18023 retinol-binding protein 2, retinol-binding protein 3, interstitial/RBP3 18028 retinol-binding protein 4, interstitial/RBP4 18025 serum vitamin D-binding protein 4, interstitial/RBP4 18025 serum vitamin D-binding protein 6 139200 transthyretin (prealbumin, amyloidosis 176300 transthyretin (prealbumin, amyloidosis 176300 transthyretin (component/GC 139200 transthyretin (brealbumin, amyloidosis 176300 transthyretin (component/GC 180240 Retinoic acid receptor, beta/RARB 180220 Retinoic acid receptor, gamma/RARG 180190		apolipoprotein (a), Lp(a)/LPA	152200	NM_005577	6q27
protein 1/CRABP1  cellular retinoic acid-binding protein 2/CRABP2  retinol-binding protein 1, 18026  retinol-binding protein 2, 18028( retinol-binding protein 3, interstitial/RBP3  retinol-binding protein 4, interstitial/RBP4  serum vitamin D-binding protein/DBP/group-specific  component/GC  transthyretin (prealbumin, amyloidosis 17630C  transthyretin (prealbumin, amyloidosis 17630C  Retinoic acid receptor, alpha/RARA 18022C  Retinoic acid receptor, gamma/RARG 18019C		RBP5/cellular retinoic acid-binding			
cellular retinoic acid-binding protein  2/CRABP2 retinol-binding protein 1, 18028 retinol-binding protein 3, 18028 retinol-binding protein 3, 18029 retinol-binding protein 4, 18025 serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 17630c type 1)/TTR  Retinoic acid receptor, alpha/RARA 18022C Retinoic acid receptor, gamma/RARG 18019C		protein 1/CRABP1	180230	NM_004378	15q24
retinol-binding protein 1, 18026 retinol-binding protein 2, 18028( retinol-binding protein 3, interstitial/RBP3 retinol-binding protein 4, interstitial/RBP4 serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 17630C transthyretin (prealbumin, amyloidosis 17630C Retinoic acid receptor, alpha/RARA 18022C Retinoic acid receptor, beta/RARB 18022C		cellular retinoic acid-binding protein			
retinol-binding protein 1, 18026 retinol-binding protein 2, 18028 retinol-binding protein 3, 18029 retinol-binding protein 4, 18029 retinol-binding protein 4, 18025 serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 17630c type 1)/TTR  Retinoic acid receptor, alpha/RARA 18024C Retinoic acid receptor, beta/RARB 18022C		2/CRABP2	180231	NM_001878	1921.3
retinol-binding protein 2, retinol-binding protein 3, interstitial/RBP3 retinol-binding protein 4, interstitial/RBP4 serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 17630C trype 1)/TTR Retinoic acid receptor, alpha/RARA 18022C Retinoic acid receptor, beta/RARB 18022C		retinol-binding protein 1,	180260	80260 NM_002899	3q21-q22
retinol-binding protein 3, interstitial/RBP3 retinol-binding protein 4, interstitial/RBP4 serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis type 1)/TTR Retinoic acid receptor, alpha/RARA 18022C Retinoic acid receptor, beta/RARB 18022C Retinoic acid receptor, gamma/RARG 18019C		retinol-binding protein 2,	180280	NM_004164	3q21-qter
interstitial/RBP3 retinol-binding protein 4, interstitial/RBP4 serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 17630c type 1)/TTR  Retinoic acid receptor, alpha/RARA 18024C Retinoic acid receptor, beta/RARB 18022C		retinol-binding protein 3,			
retinol-binding protein 4, interstitial/RBP4 serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 176300 L1) transthyretin (prealbumin, amyloidosis 176300 NM type 1)/TTR Retinoic acid receptor, alpha/RARA 180240 NM Retinoic acid receptor, beta/RARB 180220 NM Retinoic acid receptor, gamma/RARG 180190 NM	Transport	interstitial/RBP3	180290	NM_002900	10q11.2
interstitial/RBP4  serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 176300 L1) transthyretin (prealbumin, amyloidosis 176300 NM type I)/TTR  Retinoic acid receptor, alpha/RARA 180240 NM Retinoic acid receptor, beta/RARB 180220 NM Retinoic acid receptor, gamma/RARG 180190 NM		retinol-binding protein 4,			
serum vitamin D-binding protein/DBP/group-specific component/GC transthyretin (prealbumin, amyloidosis 176300 type 1)/TTR Retinoic acid receptor, alpha/RARA 180240 Retinoic acid receptor, beta/RARB 180220 Retinoic acid receptor, gamma/RARG 180190 NIM—		interstitial/RBP4	180250	NM_006744	10q24
transthyretin (prealbumin, amyloidosis 176300 L1 type 1)/TTR Retinoic acid receptor, alpha/RARA 180220 NM Retinoic acid receptor, beta/RARB 180220 NM Retinoic acid receptor, gamma/RARG 180190 NM		serum vitamin D-binding			
transthyretin (prealbumin, amyloidosis 176300 L1 type I)/TTR Retinoic acid receptor, alpha/RARA 180240 NM Retinoic acid receptor, beta/RARB 180220 NM Retinoic acid receptor, gamma/RARG 180190 NM	 ,	protein/DBP/group-specific			
transthyretin (prealbumin, amyloidosis 176300 type I)/TTR  Retinoic acid receptor, alpha/RARA 180240 NIM  Retinoic acid receptor, beta/RARB 180220 NIM  Retinoic acid receptor, gamma/RARG 180190 NIM		component/GC	139200	L10641	4q12
Retinoic acid receptor, alpha/RARA180240NIMRetinoic acid receptor, beta/RARB180220NIMRetinoic acid receptor, gamma/RARG180190NIM		transthyretin (prealbumin, amyloidosis type 1)/TTR	176300	NM_00037	18q11.2-
Retinoic acid receptor, beta/RARB       180220       NM         Retinoic acid receptor, gamma/RARG       180190       NM		Retinoic acid receptor, alpha/RARA	180240	96000 MN	1
Retinoic acid receptor, beta/RARB 180220 NIM—Retinoic acid receptor, gamma/RARG 180190 NIM—	•			4	ı
Retinoic acid receptor, gamma/RARG 180190 NM		Retinoic acid receptor, beta/RARB	180220	NM_00096 5	3p24
		Retinoic acid receptor, gamma/RARG	180190	96000 MN	12q13

			Retinoid X receptor alpha/RXRA	180245	NM_00569	9q34.3
	Retinoids		Retinoid X receptor beta/RXRB	180246	X66424	6p21.3
		Receptors	Retinoid X receptor gamma/RXRG	180247	U38480	1q22-q23
		and RAR-rela Coactivators A/RORA	RAR-related orphan receptor A/RORA	600825	~	
<del></del>			RAR-related orphan receptor B/RORB 601972	601972	****	15q21-q22
			RAR-related orphan receptor C/RORC 602943		0 0806 0	i
Adinocyte			nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	****
Differentiati			silencing mediator for retinoid and thyroid hormone receptors/SMRT	600848	600848 NM 006312	***
			retinoic and thyroid hormone receptor			
			associated corepressor			
			1/TRAC1/NCOR1	600849	600849 NM 006311	****
			UDP glycosyltransferase 1/UGT1	191740	191740 NM_00107	Chr. 12
			UDP glycosyltransferase family 2, member B4/UGT2B4	290009	NM_00107	4q13
		Catabolism	UDP glycosyltransferase family 2, member B7/UGT2B7	890009	NM_00107 4	1914
			UDP glycosyltransferase 2 family, polypeptide B11/UGT2B11	603064	NM_00107	* * * *
			UDP glycosyltransferase family 2, member B15/UGT2B15	690009	NM_00107 6	4q13
			UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107	1q14
			Peroxisome proliferative activated receptor, alpha/PPARA	170998	NM_00503 6	22q12- q13.1

					20000 7 44	
			Peroxisome proliterative activated		NM_00023	10213
			receptor, delta/PPARD	6E+05	8	C:17h1
			peroxisome proliferative activated			
		<u>.</u>	receptor, gamma/PPARG	601487	601487 NM_005037	3p25
	Dorovisomo	Receptors	CCAAT/enhancer binding protein	116897	NM_00436	19q13.1
	Proliferation	and			r	
		Coactivators		189965	189965 NM_005194	20q13.1
			CCAAT/enhancer binding protein (C/EBP), gamma/CEBPG	138972	NM_00180 6	Chr. 19
			CCAAT/enhancer binding protein (C/EBP), delta/CEBPD	116898	₩ N	8p11.2- p11.1
			CCAAT/enhancer binding protein (C/EBP), epsilon/CEBPE	600749	NM NM	14q11.2
			acetyl-Coenzyme A carboxylase alpha/ACACA	200350	NM_00066 4	17q21
			acetyl-Coenzyme A carboxylase beta/ACACB	601557	NM_00109 3	12q24.1
			acetyl-Coenzyme A acetyltransferase I (acetoacetyl Coenzyme A thiolase)/ACATI	203750	00001 9	11q22.3- q23.1
		Biosynthesis	acetyl-Coenzyme A acetyltransferase 2 (acetoacetyl Coenzyme A thiolase)/ACAT2	100678	NM_00589	6425.3-426
		·	ATP citrate lyase/ACLY	108728	NM_00109 6	1.12971
			glycerol-3-phosphate acyltransferase, mitochondrial/GPAM1	602395	****	10q24-q26
			fatty acid synthase/FASN	600212	NM_00410 4	17q25
•				-	_	_

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	apolipoprotein A1 of HDL/APOA1	107680	107680 NM_000039	11423
	apolipoprotein A2/APOA2	107670	107670 NM_001643	3 1q21-q23
	apolipoprotein A4/APOA4	107690	107690 NM_000482	11923
	apolipoprotein B (including Ag(x)			
	antigen)/APOB	107730	107730 NM_000384	1 2p24
	apolipoprotein B mRNA editing			
	enzyme, catalytic polypeptide	600130	600130 NM_005889	12p13.1
	APOBEC1 binding			
	protein/ABBP1/heterogeneous nuclear			
	ribonucleoprotein A/B/HNRPAB	602688	602688 NM_004499	****
Transport	apolipoprotein C1/APOC1	107710	107710 NM 001645	19q13.2
	apolipoprotein C2/APOC2	207750	207750 NM_000483	19q13.2
	apolipoprotein C3/APOC3	107720	107720 NM_000040	11923
	apolipoprotein C4/APOC4	600745	600745 NM_001646	19q13.2
	apolipoprotein D/APOD	107740	107740 NM 001647	3q26.2-qter
	apolipoprotein E/APOE	107741	107741 NM_000041	19q13.2
	apolipoprotein F/APOF	107760	107760 NM_001638	Chr.12
	apolipoprotein H (beta-2-glycoprotein			
	I)/APOH	138700	138700 NM 000042	17q23-qter
	apolipoprotein J/clustrin/APOJ/CLU	185430	185430 NM 001831	8p21-p12
	apolipoprotein L/APOL	603743	AF019225	Chr. 22
	pancreatic triglyceride lipase/PNLIP	246600	AH003527	10q26.1
	enterostatin/colipase, pancreatic/CLPS	120105	120105 NM_001832 6pter-p21.1	6pter-p21.1
	low density lipoprotein receptor			
	(familial hypercholesterolemia)/LDLR	143890	NM_000527	143890 NM_000527 9p13.2-p13.1
••	low density lipoprotein receptor-			
	related protein 1/LRP1	107770	NM_002332	107770 NM_002332 2q13.1-q13.3
	low density lipoprotein receptor-			
	related protein 2/LRP2	600073	U33837	2q24-q31

			low density linourotein recentor.			
			related protein 5/LRP5	603506	AF077820	110134
			low density lipoprotein receptor-			t.Crhir
		Untake	related protein 8/LRP8	602600	602600 NM 004631	1p34
		awad o	low density lipoprotein receptor-			
			related protein-associated protein	104225	104225 NM_002337	4p16.3
			oxidized low density lipoprotein			
			receptor/OLR1	602601	602601 NM 002543 12p13-p12	12p13-p12
			very low density lipoprotein			
			receptor/VLDLR	192977	192977 NM 003383	9p24
			microsomal triglyceride transfer			
Linid	Linid		protein large subunit/MTP	157147	157147 NM 000253	4q22-q24
Metaholism	Metaholism		sortilin related receptor/SORL1	602005	602005 NM 003105 1923 2-924 2	11023 2-024
and Storage	and Storage		plasma cholesterol ester transfer			7
9	and other		protein/CETP	118470	118470 NM 000078	16921
			phospholipid transfer protein/PLTP	172425	172425 NM 006227 20q12-q13.	20q12-q13.
		Storage	glycerol-3-phosphate acyltransferase,			
		78# IOIC	mitochondrial/GPAM1	602395	***	10q24-q26
			lipoprotein lipase/LPL	238600	238600 NM_000237	8p22
			lipase, hepatic/LIPC	151670	151670 NM_00023	15q21-q23
			adrenergic, beta-3-, receptor/ADRB3	109691	109691 NM 000025 8p12-p11.2	8p12-p11.2
		Release	lysosomal acid lipase/LIPB	278000 1	278000 NM 000235 10q24-q25	10q24-q25
			lipase, hormone-sensitive/LIPE	151750	151750 NM 005357 9q13.1-q13	9q13.1-q13
			perilipin/PL/N	170290	170290 NM 002666	15g26
			fatty acid binding protein 4,			
			adipocyte/FABP4	600434	600434 NM_001442	8q21
		_	Fatty acid CoA Ligase, long chain 1/FACL1	152425	* * * * *	3q13

	Fatty acid CoA Ligase, long chain 2/FACL2	152426	* * * * *	4q34-q35
Coenzyme A Ligases	Coenzyme A Fatty acid CoA Ligase, long chain Ligases 3/FACL3	602371	NM_00445	2q34-q35
	Fatty acid CoA Ligase, long chain 4/FACL4	300157	NM_00445 8	Xq22.3
·	Fatty acid CoA Ligase, very long chain 1/FACVL1	603247	NM_00364 5	15921.2
	acyl-Coenzyme A dehydrogenase, long 201460 NM_001608	201460	NM_001608	2q34-q35
	acyl-Coenzyme A dehydrogenase, C-4   201450 NM_000016	201450	NM_000016	1p31
	acyl-Coenzyme A dehydrogenase, C-2		201470 NM 000017	12q22-qter
	camitine palmitoyltransferase I, liver,			
	nuclear gene encoding mitochondrial protein/CPT1A	600528	600528 NM 001876	11013
<del></del>	camitine palmitoyltransferase II,			2262
	nuclear gene encoding mitochondrial	-	<del>1</del>	
	protein/CPT2	600650	600650 NM 000098	1p32
	carnitine/acylcarnitine	212138	212138 NM 000387	3p21.31
	Enoyl-CoA, hydratase/3-hydroxyacyl	261515	NM_00196	3927
	CON deligation of the ADA		٥	
	hydroxyacyl-CoA dehydrogenase/3-		NTA 00010	
	ketoacyl-CoA thiolase/enoyl-CoA	068009	14INI_00018	2p23
	nydratase, alpha subunit/HADHA			
	hydroxyacyl-CoA dehydrogenase/3-		91000 7414	
B-Oxidation	ketoacyl-CoA thiolase/enoyl-CoA	143450	143450 NIM_00018	2p23
TOTAL DE	hydratase, beta subunit/HADHB		າ	•
	acyl-Coenzyme A oxidase 1/ACOX1	264470	NM_00403	30021
	(peroxisomal)	-01110	5	1,443
	acyl-Coenzyme A oxidase 2, branched chain/ACOX2 (peroxisomal)	601641	NM_00350 0	3p14.3
			ļ	

		acyl-Coenzyme A dehydrogenase, C-2 to C-3 sho.t chain precursor/ACADS (mitochondrial)	201470	NM_00001	12q22-qter
		acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain/ACADM (mitochondrial)	201450	201450 NM_00001 6	1p31
		acyl-Coenzyme A dehydrogenase, long chain/ACADL (mitochondrial)	201460	NM_00160 8	2q34-q35
		hydroxyacyl-Coenzyme A dehydrogenase, type IVHADH2	602057	602057 NM_00449	* * * * *
		enoyl-Coenzyme A hydratase 1/ECH1 (peroxisomal)	969009	NM_00139	19413
	Regulation	calcitonin/calcitonin gene-related pepti	114130	114130 NM 001741 1p15.2-p15.	1p15.2-p15.1
·	(see also	calcitonin/calcitonin gene-related pepti 114160	114160	X02404	1p15.2-p15.2
	parathyroid	calcitonin receptor/CALCR	114131	114131 NM 001742	7q21.3
	hormone)	calcitonin receptor-like/CALCRL	114190	114190 NM 005795	****
	,	stamiocalcin/STC1	601185	601185 NM 003155	8p21-p11.2
		sodium-calcium exchanger (isoform Nt 182305	182305	AF128524	2p23-p22
		sodium-calcium exchanger (isoform N¢ 601901	601901	***	Chr.14
	Uptake	solute carrier family 12		NM 00033	15015
		(sodium/potassium/chloride transporters), member 1/SLC12A1	600839	8	421.1
	Efflux	regucalcin (senescence marker protein-30)/RGN	300212	NM_00468	Xp11.2-
Calcium		bone gamma-carboxyglutamate (gla) protein (osteocalcin)/BGLAP	112260	112260 NM_00071	1925-931
Metabolism		matrix gamma-carboxyglutamate (gla) protein/MGP/MGLAP	154870	06000_MN 0	12p13.1- p12.3
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			gamma-glutamyl carboxylase/GGCX	137167	NM_00082	2p12
	•		secreted phosphoprotein 1/SPP1/osteop	166490	D14813	4q21-q25
		Calcium Deposition	sialoprotein, bone sialoprotein	147563	NM_00496	4q21-q25
			vitamin D (1,25- dihydroxyvitamin			
			D3) receptor/VDR	601769	601769 NM_000376 12q12-q14	12q12-q14
			core binding factor alpha1			
			subunit/CBFAI/runt-related			
			transcription factor 2/osteoblast-	600211	AH005498	6p21
			osteonectin/ON/secreted protein,	182120	NM_00311	5031 3-032
			acidic, cysteine-nch/SPARC		&	7ch-c-1chc
			osteoprotegrin ligand/OPGL/tumor			
	٠		necrosis factor receptor superfamily,			
			member 11a, activator of			
			NFKB/TNFRSF11A	602642	602642 NM 003839	13914
			bone morphogenetic protein 1/BMP1	112264	112264 NM 006132	8p21
			bone morphogenetic protein 2			
			precursor/BMP2	112261	NM_001200	20p12
		Rone	bone morphogenetic protein 3			
Calcium		Growth	(osteogenic) precursor/BMP3	112263	112263 NM 001201	4p14-q21
Homeostasis		Factors	bone morphogenetic protein 4/BMP4	112262	112262 NM_001202	14q22-q23
			bone morphogenetic protein 5/BMP5	112265	***	Chr. 6
			bone morphogenetic protein 6/BMP6	112266	112266 NM 001718	6p24-p23
	Bone		osteogenic protein 1/OP1/bone			
	Growth		morphogenetic protein 7			
	Factors and		precursor/BMP7	112267	112267 NM_001719	Chr.20
	Keceptors		osteogenic protein 2/OP2/bone			
			morphogenetic protein 8			
			precursor/BMP8	602284	602284 NM 001720 1p35-p32	1p35-p32

		osteoprotegerin/OPG/tumor necrosis			
		factor receptor superfamily, member			
		11b/TNFRSF11B	602643	602643 NM 002546	8q24
		bone morphogenetic protein receptor,			
	Recentors	type IA/BMPR1A	601299	601299 NM 004329	10q22.3
• •	s too day	bone morphogenetic protein receptor,			
		type IB/BMPR1B	603248	603248 NM_001203	4q23-q24
		bone morphogenetic protein receptor,		NM 00120	
		type II precursor (serine/threonine kinase)/BMPR2	600020	4	2q33-q34
		cytochrome D450 cultfornily, VVI/IIB			
		cytochrome F450, subramily XXVIIB			
ţ.	Biosynthesis	Biosynthesis (25-hydroxyvitamin D-1-alpha-			
		hydroxylase), polypeptide 1/CYP27B1 264700 NM_000785	264700	NM_000785	12q14
•		vitamin D (1,25- dihydroxyvitamin			
,	Receptors	D3) receptor/VDR	601769	601769 NM_000376	12q12-q14
		nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	****
		vitamin D3 receptor interacting			
		protein/DRIP80	****	AF105421	****
	Signalling	vitamin D3 receptor interacting			
Vitamin D		protein/DRIP92	***	AF106934	****
		vitamin D3 receptor interacting			
		protein/DRIP130	****	AF105332	****
		cytochrome P450, subfamily XXIV			
		(vitamin D 24-hydroxylase)/CYP24	126065	126065 NM_000782k0q13.2-q13.3	0q13.2-q13.3
		serum vitamin D-binding			
	Metabolism	protein/DBP/group-specific			
	·	component/GC	139200	L10641	4q12
		calbindin 3, (vitamin D-dependent			
		calcium-binding protein)/CALB3	302020	302020 NM 004057	Хp

		Regulation	X-linked hypophosphatemia protein/HYP/phosphate-regulating endopeptidase homolog, X-linked/PHEX/PEX	307800	Y10196	Xp22.2- p22.1
	·		alkaline phosphatase, liver/bone/kidney/ALPL	171760	171760 NM_00047 8	1p36.1-p34
Phosphate	Phosphate		solute carrier family 17 (sodium phosphate), member 1/SLC17A1	182308	NM_00507 4	6p23-p21.3
Homeostasis	Metabolism		solute carrier family 17 (sodium phosphate), member 2/SLC17A2	182309	NM_00305 2	5q35
	,	Uptake	solute carrier family 17 (sodium phosphate), member 4/SLC17A4	604216	NM_00549 5	6p22-p21.3
		;	solute carrier family 20 (phosphate transporter), member 1/SLC20A1	137570	NM_00541 5	2q11-q14
			type II sodium-dependent phosphate transporter 3b/NAPI-3B/solute carrier family 34, member 2/SLC34A2	604217	604217 NM_00642	**
			interleukin 1 beta/IL1B	147720	AF043335	2q14
			interleukin 1 receptor, type VIL1R1	147810	NM_00087	2q12
		Interleukins	Interleukins interleukin 1 receptor, type 2/IL1R2	147811	NM_00463 3	2q12-q22
		***	interleukin 6/IL6	147620	AF048692	7p21
			interleukin 6 receptor/IL6R	147880	NM_00056 5	1921
			transforming growth factor, beta- 1/TGFB1	190180	M60315	9q13.1-q13.2
	Cytokines		transforming growth factor, beta- 2/TGFB2	190220	190220 NM_003238	1941

	-	transforming growth factor, beta-			
	Transformin 3/TGFB3	3/TGFB3	190230	190230 NM 003239	14q24
	g Growth Factor	transforming growth factor, beta receptor I (activin A receptor type II-like kinase, 53kD)/TGFBR1	190181	NM_00461	9q33-q34
		transforming growth factor, beta receptor II (70-80kD)/TGFBR2	190182	NM_00324 2	3p22
		receptor III (betaglycan,	600742	NM_00324 3	1p33-p32
		antigen CD51/integrin, alpha-V/vitronectin receptor/CD51/ITGAV	193210	NM_00221 0	2q31-q32
	Adhesion	integrin, alpha5/fibronectin receptor, alpha subunit/FNRA/ITGA5	135620	NM_00220 5	12q11-q13
	Molecules	lymphocyte antigen CD11C/integrin, alpha-X/CD11C/ITGAX	151510	NM_00088	16p11.2
		lymphocyte antigen CD11A/integrin, alpha-L/CD11A/TTGAL	153370	$153370 \left  \begin{array}{c} NIM_{-}00220 \\ 9 \end{array} \right $	16p11.2
Inflommatio		matrix metalloproteinase 1 (interstitial collagenase)/MMP1	120353	NM_00242 1	11q22-q23
n (additional	-	matrix metalloproteinase-like 1/MMPL1	**	NM_00414 2	***
Inflammation		matrix metalloproteinase 2 (neutrophil gelatinase)/CLG4/MMP2	120360	AH002654	16q13
`		matrix metalloproteinase 3			
		(stromelysin 1, progelatinase)/MMP3	185250	185250 NM_002422	11923
		matrix metalloproteinase 8 (neutrophil	120355	120355 NW 002424 11921-922	11021-022
	 	CONTRACTIONS OF THE OF	160000	T-7-7001111	774-1741

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		matrix metalloproteinase 9 (gelatinase			
		B, 92kD gelatinase, 92kD type IV			٠
		collagenase)/MMP9	120361	120361 NM 0049940911.2-913.1	20q11.2-q13
		matrix metalloproteinase 10			
Adhesion		(stromelysin 2)/MMP10	185260	185260 NM_002425 11q22.3-q23	11q22.3-q23
		matrix metalloproteinase 11			
		(stromelysin 3)/MMP11	185261	185261 NM 005940	22q11.2
		matrix metalloproteinase 12			
	Proteases	(macrophage elastase)/MMP12	601046	601046 NIM_002426 1922.2-922.3	1q22.2-q22.
		matrix metalloproteinase 13			
		(collagenase 3)/MMP13	600108	600108 NM_002427	11q22.3
		matrix metalloproteinase 14	1 1000	NM 00499	
		(membrane-inserted)/MMP14	600/54	۰,	14q11-q12
	·	matrix metalloproteinase 15	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	NM 00242	
		(membrane-inserted)/MMP15	107700	, <sup>∞</sup>	16q13-q21
		matrix metalloproteinase 16	130003	NM 00594	
		(membrane-inserted)/MMP16	707700		8421
		matrix metalloproteinase 17	300003	NM_00414	6 7 6 6 7
		(membrane-inserted)/MMP17	007790	-	12924.33
		matrix metalloproteinase 19/MMP19	601807	601807 NM_00242	12q14
		matrix metalloproteinase 23A/MMP23A	603320	603320 NM_00465	1p36.3
		matrix metalloproteinase	603321	603321 NM_00698	1p36.3
		23D/MIMIC 23D		3	
		matrix metalloproteinase 24	***	69900 WN *****	****
		(membrane-inserted)/MMP24		0	

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Table 6. Cardiovascular and Renal Gene List

Biosynthesis   Pathway   Function   Name   Coming Acid							
Pathway Function Name  aromatic L-Amino Acid  Biosynthesis decarboxylase/AADC/dopa  decarboxylase bytosine hydtoxylase/TH dopamine receptor D1/DRD1 dopamine Receptor D2/DRD2 dopamine Receptor D4/DRD4 dopamine receptor D4/DRD4 dopamine receptor D4/DRD5  Reuptake Solute carrier family 6 member 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine) beta-monooxygenase/DBH catebolism Denoi-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT		4					
Biosynthesis Decarboxylase/AADC/dopa decarboxylase tyrosine hydroxylase/TH dopamine Receptor D1/DRD1 dopamine Receptor D2/DRD2 Receptors dopamine Receptor D3/DRD3 dopamine receptor D3/DRD4 dopamine receptor D3/DRD4 dopamine receptor D3/DRD5 solute carrier family 6 member 3/SLC6A3 (dopamine) beta-monooxygenase/DBH catechol-O-methyltransferase/COMT monoamine beta-hydroxylase (dopamine) beta-monooxygenase/DBH catechol-O-methyltransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine) beta-monooxygenase/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT	Class	Pathway	Function	Name	OMIM	L	Locus
Biosynthesis Decarboxylase tyrosine hydroxylase tyrosine hydroxylase/TH dopamine receptor D1/DRD1 dopamine Receptor D3/DRD3 dopamine receptor D4/DRD4 dopamine receptor D4/DRD4 dopamine receptor D5/DRD5 solute carrier family 6 member 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT monoamme oxtuase x, nucrear gene encoding mitochondrial motivarhithe Oxtuase D, nucrear gene encoding mitochondrial motivarhithe Oxtuase D, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2				aromatic L-Amino Acid			
decarboxylase  tyrosine hydroxylase/TH  dopamine receptor D1/DRD1  dopamine Receptor D2/DRD2  Receptors dopamine receptor D4/DRD4 dopamine receptor D4/DRD4 dopamine receptor D5/DRD5  solute carrier family 6 member 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine) beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT motroamfine Oxidase D, nucrear gene encoding mitochondrial motroamfine Oxidase D, nucrear gene encoding mitochondrial motroamfine Oxidase D, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT			Rioevnthesis		107930		
Receptors dopamine receptor D1/DRD1 dopamine Receptor D2/DRD2  Receptors dopamine Receptor D3/DRD3 dopamine receptor D3/DRD4 dopamine receptor D3/DRD5 solute carrier family 6 member 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT mronroamme oxtrase B, nucrear gene encoding mitochondrial mrotroamflde Oxtrase B, nucrear gene encoding mitochondrial mrotroamflde Oxtrase B, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT			Diosy menesis				7p11
Receptors dopamine Receptor D2/DRD2 Reuptake dopamine Receptor D3/DRD3 dopamine receptor D4/DRD4 dopamine receptor D4/DRD4 dopamine receptor D5/DRD5  Reuptake 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT monoaxygenase)/DBH catechol-O-methyltransferase/COMT monoaxygenase)/DBH catechol-O-methyltransferase, encoding mitochondrial mottoanfl/th OA/wase D, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT				tyrosine hydroxylase/TH	191290	NM_000360	
Receptors dopamine Receptor D2/DRD2 dopamine receptor D3/DRD3 dopamine receptor D4/DRD4 dopamine receptor D5/DRD5  Reuptake 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine) beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT mrotroanmic oxtrase A, nucrear gene encoding mitochondrial mrotroanmic oxtrase Bene encoding mitochondrial mrotroanmic oxtrase D, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT				dopamine receptor D1/DRD1	126449	NM 000794	
Reuptake dopamine receptor D4/DRD4 dopamine receptor D5/DRD5 solute carrier family 6 member 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT monoammic oxidase A, nucrear gene encoding mitochondrial moticamflife Oxidase A, nucrear gene encoding mitochondrial moticamflife Oxidase A, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N-methyltransferase/PNMT				dopamine Receptor D2/DRD2	126450	NM 000795	
dopamine receptor D4/DRD4 dopamine receptor D5/DRD5  Reuptake 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT monoamme oxinase x, nucreal gene encoding mitochondrial moticanfl/fleOAtuase D, nucreal gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH  Biosynthesis phenylethanolamine-N-methyltransferase/PNMT			Receptors	dopamine Receptor D3/DRD3	126451	964000 MN	
Reuptake solute carrier family 6 member 3/SLC6A3 (dopamine)  dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT monoamine oxtuase A; nucrear gene encoding mitochondrial motical motical mitochondrial motical mitochondrial motical motica				dopamine receptor D4/DRD4	126452	NM 000797	11p15.5
Reuptake 3/SLC6A3 (dopamine) dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT monoammic oxtuase x, nucrear gene encoding mitochondrial motivarily doxtuase b, nucrear gene encoding mitochondrial motivarily 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT				dopamine receptor D5/DRD5	126453	NM 000798	4p16.1-p15.
dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH catechol-O-methyltransferase/COMT monoamme oxtuase A, nucrear gene encoding mitochondrial moticanflate Oxtuase B, nucrear gene encoding mitochondrial moticanflate Oxtuase D, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT			Reuntaka	solute carrier family 6 member	337301	NM 00104	
thway  beta-monooxygenase)/DBH  catechol-O-methyltransferase/COMT mronoamme oxtuase A; nucrear gene encoding mitochondrial mrotican/MAVAtuase D; nucrear gene encoding mitochondrial mrotican/MAVAtuase D; nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT			Neuptake	3/SLC6A3 (dopamine)	120455		5p15.3
catechol-O-methyltransferase/COMT mionoannie oxidase A; nucrear gene encoding mitochondrial moticamfite Oxidase D; nucrear gene encoding mitochondrial encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH Biosynthesis phenylethanolamine-N- methyltransferase/PNMT		Dopamine		dopamine beta-hydroxylase (dopamine	07666	-05000 3 ATA	
catechol-O-methyltransferase/COMT mromoannine oxidase A; nucrear gene encoding mitochondrial moticanfl/A Ahuase B; nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N-methyltransferase/PNMT		Pathway		beta-monooxygenase)/DBH	723300	181000_NINI	
encoding mitochondrial moticanAIA&OAtuase D, nucrear gene encoding mitochondrial phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N- methyltransferase/PNMT				catechol-O-methyltransferase/COMT	116790	NM_000754	22q11.2
encoding mitochondrial  before an incorporation and the phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N- methyltransferase/PNMT				encoding mitochondrial	309850		Xp11.23
phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N-methyltransferase/PNMT				mondamine Oknase B, nuclear gene	000		
phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N- methyltransferase/PNMT			Catabolism	encoding mitochondrial	309860		Xp11.23
tamily 1A, member 1/SULT1A1 phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N- methyltransferase/PNMT				phenol-preferring sulfotransferase,	171150	NM_00105	16p12.1-
phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2 phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N-methyltransferase/PNMT				family I.A, member 1/SULTIA1		5	p11.2
phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N-methyltransferase/PNMT				phenol-preferring sulfotransferase,	601292	NM_00105	16p12.1-
phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N-methyltransferase/PNMT				tamily 1A, member 2/S∪L11A2		4	p11.2
family 1A, member 3/SULT1A3 dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N- methyltransferase/PNMT				phenol-preferring sulfotransferase,	600641	T 10056	16,111.3
dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH phenylethanolamine-N-methyltransferase/PNMT				family 1A, member 3/SULT1A3	1+0000	L19930	10p11.2
beta-monooxygenase)/DBH phenylethanolamine-N- methyltransferase/PNMT				dopamine beta-hydroxylase (dopamine	03160	EGEOOO FAIX	
phenylethanolamine-N- methyltransferase/PNMT				beta-monooxygenase)/DBH	000077	NIMI_000/8/	9934
	•			phenylethanolamine-N-			
	_			methyltransferase/PNMT	171190	NM_002686	17q21-q22

		tyrosine hydroxylase/TH	191290	191290 NM 000360	11p15.5
		adrenergic receptor alpha-1A			ı
-		/ADRA1A	104219	104219 NM_000678	Chr.20
		adrenergic receptor alpha-1B	104220	104220 NM_000679	5q33
		adrenergic receptor alpha-1C			
		/ADRA1C	104221	104221 NM_000680	8p21
		adrenergic receptor alpha-1D			
		/ADRA1D	104222	M76446	20p13
	Recentors	adrenergic receptor alpha-2A			
	stordana	(platelet)/ADRA2A	104210	104210 NM_000681	10q24-q26
		adrenergic receptor alpha-2B (hepatic,			
		renal)/ADRA2B	104260	104260 NM_000682	Chr.2
inonhaino		adrenergic receptor alpha-2C			
pincpurine		(renal)/ADRA2C	104250	104250 NM_000683	4q16.1
and Mol-		adrenergic receptor beta-1/ADRB1	109630	109630 NM_000684	10q24-q26
Pathway		adrenergic receptor beta-2/ADRB2	109690	109690 NM_000024	5q32-q34
		adrenergic receptor beta-3/ADRB3	109691	109691 NM_000025	8p12-p11.2
		beta-adrinergic receptor kinase			
		1/ADRBK1/BARK	109635	109635 NM 001619	11cen-q13
		beta-adrinergic receptor kinase			
	Signalling	2/ADRBK2	109636	X69117	22q11
	3g	guanine nucleotide binding protein (G			
		protein), beta polypeptide 2-like			
		1/GNB2L1	109760	109760 NM_006098 5q11.2-q13	5q11.2-q13
		arrestin, beta 1/ARRB1	107940	107940 NM 004041	11q13
		vesicular amine transporter 2 / VAT2	193001	L09118	10q25
	Reuntake	vesicular amine transporter 1/ VAT1	193002	****	8p21.3
		Solute carrier family 6, member			
		5/SLC6A2/NAT1/NET1	163970	163970 NM_001043	16q12.2

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	encoding mitochondrial	309850	NM_00024 0	Xp11.23
Catabolism	mondantife oktuase 15, nucrear gene encoding mitochondrial	309860	NM_00089	Xp11.23
	catechol-O-methyltransferase/COMT	116790	116790 NM 000754	22q11.2
	choline acetyltransferase/CHAT	118490	118490 NM_003055	10q11.2
Biosynthesis	carnitine acetyltransferase/CRAT	600184	600184 NM_004003	9q34.1
	apolipoprotein E	107741	107741 NM_000041	19q13.2
	cholinergic receptor, muscarinic			
	1/CHRM1	118510	118510 NM_000738	11913
	cholinergic receptor, muscarinic			
	1/CHRM2	118493	118493 NM 000739	7q35-q36
-	cholinergic receptor, muscarinic			
	1/CHRM3	118494	U29589	1q41-q44
	cholinergic receptor, muscarinic			
	1/CHRM4	118495	118495 NM_000741 11p12-p11.2	11p12-p11.2
	cholinergic receptor, muscarinic			
	1/CHRM5	118496	AF026263	15q26
	cholinergic receptor, nicotinic, alpha			
	polypeptide 1 (muscle)			
	precursor/CHRNA1	100690	100690 NM_000079	2q24-q32
	cholinergic receptor, nicotinic, alpha			
	polypeptide 2 (neuronal)/CHRNA2	118502	118502 NM_000742	Chr.8
	cholinergic receptor, nicotinic, alpha			
	polypeptide 3 (neuronal)			
	precursor/CHRNA3	118503	118503 NM_000743	15q24
	cholinergic receptor, nicotinic, alpha			
	polypeptide 4 (neuronal)			
	precursor/CHRNA4	118504	118504 NM_000744 toq13.2-q13.3	0q13.2-q13.

Acetylcholin e Pathway	Recentors	cholinergic receptor, nicotinic, alpha			
Acetylcholin e Pathway	s fordana	polypeptide 5 (neuronal)			ند المراجع والم
e Pathway		precursor/CHRNA5	118505	118505 NM_000745	15q24
		cholinergic receptor, nicotinic, alpha			
		polypeptide 6 (neuronal)			
		precursor/CHRNA6	***	***** NM_004198	***
<del> ii-</del>		cholinergic receptor, nicotinic, alpha			
		polypeptide 7 (neuronal)			
<u>.</u>		precursor/CHRNA7	118511	118511 NM_000746	15q14
		cholinergic receptor, nicotinic, beta			
		polypeptide 1 (muscle)/CHRNB1	100710	100710 NM_000747	17p12-p11
		cholinergic receptor, nicotinic, beta			
		polypeptide 2 (neuronal)/CHRNB2	118507	118507 NM_000748	1p21
•	•	cholinergic receptor, nicotinic, beta			
		polypeptide 3/CHRNB3	118508	118508 NM_000749	8p11.2
		cholinergic receptor, nicotinic, beta			
		polypeptide 4/CHRNB4	118509	118509 NM 000750	15q24
		cholinergic receptor, nicotinic, epsilon			
		polypeptide/CHRNE	100725	100725 NM_000080	Chr.17
		cholinergic receptor, nicotinic, delta			
		polypeptide/CHRND	100720	100720 NM_000751	2q33-q34
		cholinergic receptor, nicotinic, gamma			
		polypeptide/CHRNG	100730	100730 NM_005199	2q33-q34
		solute carrier family 18 (vesicular			
X	Keuptake	acetylcholine), member 3/SLC18A3	600336	600336 NM 003055	10q11.2
		acetylcholinesterase (YT blood group)			
	-	precursor/ACHE	100740	100740 NM_000665	7q22
<u> </u>	Catabolism	butyrylcholinesterase 1/serum			
		cholinesterase 1/BCHE1	177400	177400 NM 0000553q26.1-q26.2	3q26.1-q26.2

	butyrylcholinestarase 2/serum			
	cholinesterase 2/BCHE2	177500	***	2q33-q35
	aromatic L-Amino Acid			
. •	Decarboxylase/AADC	107930	AH005280	7p11
	tryptophan hydroxylase (tryptophan 5-			
	monooxygenase)/TPH	191060	191060 NM 004179 11p15.3-p14	11p15.3-p14
· · · · · · ·	14-3-3 protein tyrosine 3-			
	monooxygenase/tryptophan 5-			
	monooxygenase activation protein, eta			
	polypeptide/YWHAH	113508	13508 NM 003405	22q12
	14-3-3 protein tyrosine 3-			
	monooxygenase/tryptophan 5-			
	monooxygenase activation protein,			
Ricevneth	Biosynthesis epsilon polypeptide/YWHAE	****	***** NM 006761	****
	14-3-3 protein tyrosine 3-			
	monooxygenase/tryptophan 5-			
· .	monooxygenase activation protein,			
	zeta polypeptide/YWHAZ	601288	601288 NM_0034062p25.2-p25.	2p25.2-p25.1
	14-3-3 protein tyrosine 3-			
	monooxygenase/tryptophan 5-			
	monooxygenase activation protein,			
	beta polypeptide/YWHAB	601289	601289 NM 003404	20q13.1
	14-3-3 protein tyrosine 3-			
	monooxygenase/tryptophan 5-			
	monooxygenase activation protein,			
	theta polypeptide/YWHAQ	* * * * *	***** NM_006826	***
	G protein-coupled 5-			
	hydroxytryptamine (serotonin)	109760	109760 NM 000524 5q11.2-q13	5a11.2-a13

		G protein-coupled 5-	1001		
		ijyuroxyu yptamine (serotonin)	182131	182131 NM 000863	6q13
		G protein-coupled 5-			
		hydroxytryptamine (serotonin)	312861	U49516	Xq24
Serotonin		G protein-coupled 5-			
Pathway		hydroxytryptamine (serotonin)	182133	182133 NM_000864 1p36.3-p34.3	1p36.3-p34.
		G protein-coupled 5-			
		hydroxytryptamine (serotonin)	182132	182132 NM_000865	6q14-q15
		G protein-coupled 5-			
		hydroxytryptamine (serotonin)	182134	L05597	3p12
		G protein-coupled 5-			
		hydroxytryptamine (serotonin)	182135	D87030	13q14-q21
	Recentors	G protein-coupled 5-			
·	s tordanne	hydroxytryptamine (serotonin)	601122	601122 NM_0008672q36.3-q37.1	2q36.3-q37.
		G protein-coupled 5:			
<del></del>		hydroxytryptamine (serotonin)	312861	312861 NM_000868	Xq24
	• .	gated ion channel 5-			
		hydroxytryptamine (serotonin)	182139	182139 NM 000869 1923.1-923.2	1q23.1-q23.
		gated ion channel 5-			
	• •	hydroxytryptamine (serotonin)	****	***** NM 006028	***
	**.*	G protein-coupled 5-			
•		hydroxytryptamine (serotonin)	602164	Y08756	5931-933
		G protein-coupled 5-			
		hydroxytryptamine (serotonin)	601305	X81411	7q36.1
		G protein-coupled 5-			
		hydroxytryptamine (serotonin)	601109	601109 NM_000871	1p36-p35
		G protein-coupled 5-			
1		hydroxytryptamine (serotonin)	182137	L21195	10q21-q24

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			solute carrier family 6			
			(neurotransmitter transporter,			
		Reuptake	serotonin), member 4/SLC6A4	182138	182138 NM_001045 17911.1-912	17q11.1-q12
			monoamine oxidase A, nuclear gene			
			encoding mitochondrial	309850	309850 NM 000240	Xp11.23
		Cotobolism	monoaniine oxidase B, nuclear gene			1
		Catabolism		309860	M69177	Xp11.23
			serotonin N-Acetyltransferase/SNAT	600950	U40347	17q25
			tryptophan 2,3-dioxygenase/TDO2	191070	191070 NM 005651	4q31-q32
		Riosynthesis	adenylosuccinate lyase/ADSL	103050	103050 NM_000026	22q13.1
			adenylosuccinate synthetase/ADSS	103060	103060 NM_001126	lcen-q12
			adenosine A1 receptor (G-protein			
		-	coupled)/ADORA1	102775	102775 NM_000674	1932.1
	·		adenosine A2a receptor (G-protein			
			coupled)/ADORA2A	102776	102776 NM_000675	22q11.2
			adenosine A2b receptor (G-protein			
			coupled)/ADORA2B	600446	600446 NM_000676 17p12-p11.2	17p12-p11.2
			adenosine A3 receptor (G-protein			
			coupled)/ADORA3	600445	600445 NM 000677	1p21-p13
			adenosine A2 receptor-			
			like/ADORA2L1	102777	* * * * *	0q25.3-q26.3
			purinergic receptor P2X, ligand-gated			
			ion channel, 1/P2RX1	600845	600845 NM_002558	****
			purinergic receptor P2X, ligand-gated			
			ion channel, 3/P2RX3	600843	600843 NM_002559	11912
			purinergic receptor P2X, ligand-gated		,	
			ion channel, 4/P2RX4	600846	600846 NM_002560	12924.32
Neuro-		Receptors	purinergic receptor P2X, ligand-gated			
andooring	Adenosine		ion channel, 5/P2RX5	602836	602836 NM 002561	****

Control of	Pathway		purinergic receptor P2X, ligand-gated			
Heart Rate			ion channel, 7/P2RX7	602566	602566 NM_002562	12q24
Vascular			purinergic receptor P2Y (G-protein			
Tone and			coupled) 1/P2RY1	601167	601167 NM_002563	3q25
Renal			purinergic receptor P2Y (G-protein			
Function			coupled) 2/P2RY2	600041	U07225	1q13.5-q14.1
			purinergic receptor P2Y (G-protein			
			coupled) 4/P2RY4	300038	300038 NM_002565	Xq13
			purinergic receptor P2Y (G-protein			
			coupled) 6/P2RY6	602451	602451 NM_004154	11q13.5
			leukotriene B4 receptor/purinergic			
			receptor P2Y (G-protein coupled)			
			7/P2RY7	601531	601531 NM_000752 14q11.2-q12	14q11.2-q1
	. •		purinergic receptor P2Y (G-protein			
			coupled) 11/P2RY11	602697	602697 NM_002566	***
			Solute carrier family 29 (nucleosides),			
		Dountake	member 1/SLC29A1/ENT1	602193	602193 NM_0049556p21.2-p21.1	5p21.2-p21.
		Neuptane	Solute carrier family 29 (nucleosides),			
			member 2/SLC29A2/ENT2	602110	X86681	11913
		Catabolism	adenosine deaminase	102700	102700 NM_000022	20q13.11
		Biosynthesis	Biosynthesis Histidine Decarboxylase	142704	M60445	15q21-q22
			histamine H1 receptor/HRH1	600167	NM_00086	3p21-p14
		Receptors	histamine H2 receptor/HRH2	142703	AB023486	****
	Histaminergi	:	histamine H3 receptor/HRH3	***	NM_00723	***
	C F at II way		Histamine. N-	****	***** NM_006895	chr. 2
		Amine o	Amine oxidase (copper-containing)	896609	D88713	17021
		Catabonsiii	2/AOC2	007700	D00213	176/1

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	_	Amino Carial Comment			
		containing oxidase (copper-containing)			
		3/AOC3	603735	AF054985	17q21
		nitric oxide synthetase I/NOS1	163731	AH001515	2q24.2-q24.3
		nitric oxide synthetase 2A/NOS2A	163730	X85766	17cen-q11.2
		macrophage nitric oxide synthetase			
		2B/NOS2B	600719	AH006623	17p13.1-q25
		macrophage nitric oxide synthetase			
	Biosynthesis 2C/NOS2C	2C/NOS2C	600720	600720	17p13.1-q25
Nitric Ovide		nitric oxide synthetase 3/NOS3	163729	AH001515	7q36
Dothway	:	chondrocyte nitric oxide synthetase			
atuway		3/NOS4	163728	X73029	****
		arginase/ARG1	207800	207800 NM 000045	****
		arginase/ARG2	107830	107830 NM_001172 4q24.1-q24.	4q24.1-q24.3
		guanylate cyclase 1, soluble, beta 2/GU 603695		AF038499	13q14.3
	Recentors	guanylate cyclase 1, soluble, beta 3/GU 139397 NM_000857	139397	NM_000857	4q32
	Sindana	guanylate cyclase 1, soluble, alpha 3/G 139396 NM_000856	139396	NM_000856	4q32
		guanylate cyclase 1, soluble, alpha 2/G 601244 NM_000855	601244	NM_000855	11q21-q22
		membrane			
		metalloendopeptidase/MME/neutral			
		endopeptidasc	120520	120520 NM_000902	3q21-q27
		calpain, large polypeptide L3/CAPN3	114240	114240 NM_000070 5915.1-921.	5q15.1-q21.1
		leucyl/cystinyl	151300	151300 NM 005575	***
		carboxypeptidase N polypeptide			
Conoral		1/CPN1	603103	603103 NM 001308	chr. 10
Metabolism	Biosynthesis	carboxypeptidase N polypeptide			
for Pentide	and	2/regulatory subunit/CPN2	603104	J05158	8p23-p22
Hormones	Catabolism	meprin alpha subunit/MEP1A	886009	600388 NM_0059256p21.2-p21.	5p21.2-p21.1
		meprin beta subunit/MEP1B	686009	600389 NM_005925 8q12.2-q12.	8q12.2-q12.3
	. ,	prolyl endopeptidase/PREP	600400	600400 NM_002726	6q22

		neuroendocrine convertase 1/NEC1	162150	D73407	5q14-q21
		peptidylglycine alpha-amidating monooxygenase /PAM/NEC2	170270	170270 NM 000919	5914-921
		paired basic amino acid cleaving			1
		enzyme/PACE/FUR	136950	X04329	15q25-q26
Chologistolis	Biosynthesis	Biosynthesis Cholecystokinin/CCK	118440	118440 NM_000729	3pter-p21
nin (CCK)	December	Cholecystokinin A receptor/CCKAR	118444	118444 NM_0007304p15.2-p15.	4p15.2-p15.1
min (CCAN)	Neceptors	Cholecystokinin B receptor/CCKBR	118445	NM_000731	118445 NM_000731 1p15.5-p15.4
	Biosynthesis	Biosynthesis Neuropeptide Y/NPY	162640	162640 NM_000905	7p15.1
		Neuropeptide Y receptor Y1/NPY1R	162641	162641 NM_000909	4q31.3-q32
Neuronentid		Neuropeptide Y receptor Y2/NPY2R	162642	162642 NM_000910	4q31
e Y (NPY)	Becentors	Neuropeptide Y receptor			
	e rondaaay	Y3/chemokine receptor	162643	X71635	2q21
		Neuropeptide Y receptor Y5/NPY5R	602001	602001 NM_006174	4q31-q32
		Neuropeptide Y receptor Y6/NPY6R	601770	601770 NM_006173	5q31
	O. Co. de mario de Co.	kininogen/KNG	228960	****	3927
	Diosymenesis	kallikrein 1/KLK1	147910	AH002853	AH002853 9q13.2-q13.4
		bradykinin receptor B1/BDKRB1 G			
	Dogonton	protein-coupled	600337	NM_000710	600337 NM_000710 4q32.1-q32.5
	verebrou	bradykinin receptor B2/BDKRB2 G			
		protein-coupled	113503	NM_000623	113503 NM_000623 4932.1-932.2
Bradykinin		X-prolyl aminopeptidase			
		(aminopeptidase P) 2, membrane-			
		bound/XPNPEP2	300145	300145 NM_003399	Xq25
	Catabolism	carboxypeptidase N, polypeptide 1,			
		50kD/CPN1	603103	603103 NM_001308	Chr.10
		carboxypeptidase N, polypeptide 2,			
¥		83kD/CPN2	603104	***	8p23-p22

Adrenomedu	Biogunthosis	adrenomedullin/ADM			
llin	DIOSYMEMESIS		103275	103275 NM_001124	11p15.4
		angiotensinogen/angiotensin I/AGT	106150	106150 NM_000029	1q42-q43
		renin/REN	179820	179820 NM_000537	1932
		renin-binding protein/RENBP	312420	312420 NM_002910	Xq28
		membrane			
	Riocynthoeic	metalloendopeptidase/MME/neutral			
			120520	120520 NM 000902	3q21-q27
		thimet oligopeptidase 1/THOP1	601117	601117 NM_003249	19p13.3
	٠	chymase 1, mast cell/CMA1	118938	118938 NM_001836	14q11.2
		angiotensin converting			
Angiotensin		enzyme/dipeptidyl	106180	106180 NM 000789	17q23
	-	angiotensin receptor 1/AGTR1	106165	106165 NM_000685	3q21-q25
		angiotensin receptor 1B/AGTR1B	600015	600015 NM 004835	***
	Receptors	angiotensin receptor-like 1/AGTRL1	600052	600052 NM_005161	11912
		angiotensin receptor-like 2/AGTRL2	601256	601256 NM_005162	***
		angiotensin receptor 2/AGTR2	300034	300034 NM_000686	Xq22-q23
		X-prolyl aminopeptidase			
		(aminopeptidase P) 2, membrane-	_		
		bound/XPNPEP2	300145	300145 NM_003399	Xq25
	Catabolism	Catabolism prolylcarboxypeptidase/PRCP	176785	176785 NM_005040	11q14
		arginine vasopressin (neurophysin II,			
		antidiuretic hormone, diabetes			
	Biosynthesis	Biosynthesis insipidus, neurohypophyseal)/AVP	192340	192340 NM_000490	20p13
		arginine vasopressin receptor			
Vasopressin		1A/AVPR1A	600821	600821 NM_000706 12q14-q15	12q14-q15
	Receptors	arginine vasopressin receptor	1 89009	5000544 DON 19707	1,23
			000501	VIVI 000 / 0 /	7ch1

		C actuación accommodors ourinitato			
		arginne vasopressin receptor 2			
		(nephrogenic diabetes	304800	304800 NM_000054	Xq28
	Catabolism	Catabolism leucyl/cystinyl	151300	151300 NM_005575	* * * * * * * * * * * * * * * * * * * *
		prepro-vasoactive intestinal	192320	AH003029	6q26-q27
	Biosynthesis	Biosynthesis adenylate-cyclase activating			
		polypeptide 1/ADCYAP1	102980	102980 NM_001117	18p11
Vecception		vasoactive intestinal peptide receptor			
Intestinal		1/V <b>PR</b> 1	192321	192321 NM_004624	3p22
Dentide		vasoactive intestinal peptide receptor			
anidat	Receptor	2/VIPR2	601970	601970 NM_003382	7q36.3
		adenylate cyclase activating			
		polypeptide 1 (pituitary) receptor type			
		VADCYAP1R1	102981	102981 NM_001118	7p14
·		atrial natriuretic peptide precursor			
		A/NPPA	108780	X01471	1p36.2
	Biosynthesis	Biosynthesis natriuretic peptide precursor B/NPPB	600295	600295 NM_002521	1p36.2
		atrial natriuretic peptide precursor			
		C/NPPC	600296	D28874	2q24-qter
Natrimretic		natriuretic peptide receptor			
Pentide		A/guanylate cyclase A (atrionatriuretic			
and a		peptide receptor C)/NPR1	108960	108960 NM_000906	1q21-q22
	Dogostore	natriuretic peptide receptor B, isoform			
	s roidanav	a/NPR2	108961	108961 NM_000907	9p21-p12
		natriuretic peptide receptor			
		C/guanylate cyclase C (atrionatriuretic			
		peptide receptor C)/NPR3	108962	108962 NM 000908	5p14-p12
	·	cytochrome P450, subfamily XIB,			
	Synthesis	polypeptide 2 (steroid 11-b-			
	(additional	hydroxylase)/CYP11B2	124080	124080 NM_000498	8q21

	genes in	sodium channel, nonvoltage-gated 1			
	steroid	alpha/SCNN1A	600228	600228 NM_001038	12p13
	hormone	sodium channel, nonvoltage-gated 1,			
	meiabolism	beta (Liddle syndrome)/SCNN1B	900,160	600760 NM 000336 16p13-p12	16p13-p12
Winerslocort	(мотво	sodium channel, nonvoltage-gated 1,			
icoeteroide		gamma/SCNN1G	600761	600761 NM_001039 16p13-p12	16p13-p12
(aldosterone		mineralocorticoid			
deoxycortico		receptor/MCR/nuclear receptor			
sterone)		subfamily 3, group C, member	600983	600983 NM_000901	4q31.1
(2::2:2:2:2:2:2:2:2:2:2:2:2:2:2:2:2:2:2		nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	****
	Receptor	oxysterol binding protein/OSBP	167040	167040 NM_002556	11q12-q13
	and	sterol regulatory element binding			
	Coactivators	Coactivators transcription factor 1/SREBF1	184756	184756 NM_004176	17p11.2
		sterol regulatory element binding			
		transcription factor 2/SREBF2	600481	600481 NM_004599	22q13
		steroid receptor coactivator 1/SRC1	602691	602691 NM_003743	2p23
		steroid receptor RNA activator/SRA	603819	603819 AF092038	Chr. 5
		cytochrome P450, subfamily XIX			
	Synthesis	(androgen aromatase)/CYP19	107910	107910 NM 000103	15q21.1
		estrogen receptor 1/ESR1	133430	133430 NM_000125	6q25.1
Estrogens	Recentors	estrogen receptor 2/ESR2	601663	601663 X99101	14q
	stord	estrogen-related receptor	601998	601998 NM_004451	11912
		estrogen-related receptor beta/ESRRB	602167	602167 NM_004452	14q24.3
	Catabolism	Catabolism estrogen-preferring	600043	600043 NM 005420	4q13.1
		hydroxy-delta-5-steroid		NIN DODGE	
		dehydrogenase, 3 beta- and steroid	109715	109715 1111 00000	1p13.1
	Counthoods	delta-isomerase 1/HSD3B1		7	

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		hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2	201810	NM_00019 8	1p13.1
Progestins		progesterone receptor/PGR	264080	NM_00092 6	11922
	\$	heat shock 90-kD protein 1, alpha subunit/HSPCA	140571	* * * * * *	1q21.2-q22
	Keceptors	heat shock 90-kD protein 1, beta subunit/HSPCB	140572	104988	6012
		FK506-binding protein 5/FKBP5	602623	NM_00411	* * * * * * * * * * * * * * * * * * *
		steroid-5-alpha-reductase, alpha			
		polypeptide 1 (3-0x0-5 alpha-steroid delta 4-dehydrogenase alpha			
		1)/SRD5A1	184753	184753 NM_001047	5p15
	Synthesis	hydroxysteroid (17-beta)			
	o) murcan	dehydrogenase 3/HSD17B3	264300	264300 NM_000197	9q22
Androgens		cytochrome P450, subfamily XIA		NM 00078	
smago in inv		(cholesterol side chain	118485	-	15q23-q24
		cleavage)/CYP11A		•	
		steroid 5-alpha-reductase 2/SRD5A2	264600	264600 NM_000348	2p23
		androgen receptor			
	Receptor	(dihydrotestosterone receptor)/AR	313700	313700 NM 000044	Xq11-q12
		UDP glycosyltransferase 2 family,			
	Catabolism	Catabolism polypeptide B17/UGT2B17	601903	601903 NM_001077	4q13
		nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	****
Mediators of		oxysterol binding protein/OSBP	167040	167040 NM_002556	11q12-q13
Steroid		sterol regulatory element binding			
Response	Transcriptio	Transcriptio transcription factor 1/SREBF1	184756	184756 NM_004176	17p11.2

		_				
	(common to	n Factors	sterol regulatory element binding			
	the steroid		transcription factor 2/SREBF2	600481	600481 NM 004599	22q13
	hormones)		steroid receptor coactivator 1/SRC1	602691	602691 NM 003743	L
			steroid receptor RNA activator/SRA	603819	603819 AF092038	Ĺ
			vascular endothelial growth		NM 00337	
			factorVEGFA	192240	9	6p12
		Biogynthogia			NM 00337	
		Diosymmesis	factor/VEGFB	601398		11913
	Vascular		vascular endothelial growth		NM 00542	
	Endothelial		factor/VEGFC	601528	6	****
	Growth		kinase insert domain			
	Factor		receptor/KDR/FLK1/VEGF			
		Pecentore	receptor/VEGFR	191306	AF063657	4912
		e Ioidanay	fms-related tyrosine kinase 1 (vascular			
		-	endothelial growth factor/vascular		NM 00201	
1			permeability factor receptor)/FLT1	165070	6	13q12
	Growth	Biosynthesis	Biosynthesis growth hormone/GH1	139250	139250 NM_000515	17q22-q24
1	Hormone	Receptors	growth hormone receptor/GHR	600946	600946 NM 000163	31
			endothelin 1/EDN1	131240	131240 NM 001955	
		Biosynthesis	Biosynthesis endothelin 2/EDN2	131241	131241 NM_001956	1p34
			endothelin 3/EDN3	131242	131242 NM_0001140q13.2-q13	.0q13.2-q13.3
-	Endothelin		endothelin converting enzyme 1/ECE1	600423	600423 NM_001397	1p36.1
		Recentors	endothelin A receptor isoform delta			
			3/EDNRA	131243	AF014826	Chr.4
			endothelin receptor type B/EDNRB	131244	131244 NM_000115	13922
			protein kinase C beta/PRKCB	176970	X06318	16p11.2
			transforming growth factor, beta-			
			1/TGFB1	190180	M60315	9913.1-913.3

	Ricevnthesis	Riosunthesis transforming grounth factor hate			
		2/TGFB2	190220	190220 NM 003238	1941
		transforming growth factor, beta-		ı	
I ransiormin		3/TGFB3	190230	190230 NM_003239	14q24
Factor Beta		transforming growth factor, beta		137 00 7 ATA	
		receptor I (activin A receptor type II-	190181	14INI_00401	9933-934
		like kinase, 53kD)/TGFBR1		7	
	Receptors	transforming growth factor, beta	100182	NM_00324	2-77
		receptor II (70-80kD)/TGFBR2	120102	2	77dc
		uansioning grown racioi, octa		NM 00324	
		receptor III (betaglycan,	600742	3	1p33-p32
		heparin-binding growth factor 1/FGF1   131220 NM_000800	131220	NM_000800	5q31
		basic fibroblast growth factor/FGF2	134920	134920 NM_002006	4q25-q27
	-	fibroblast growth factor 3/FGF3	164950	164950 NM 005247	11913
		HST oncogene/fibroblast growth			
		factor 4/FGF4	164980	164980 NM_002008	11q13
		fibroblast growth factor-related			
		protein/FGF5	165190	165190 NM_004464	4921
		fibroblast growth factor 6/FGF6	134921	X57075	12p13
		keratinocyte growth factor/fibroblast			
		growth factor 7/FGF7	148180	148180 NM_002009 15q15-q21.	15q15-q21.
		fibroblast growth factor 8 (androgen-			
	Biosynthesis	Biosynthesis induced)/FGF8	600483	600483 NM_006119	10q24
		fibroblast growth factor 9 (glia-			
		activating factor)/FGF9	600921	600921 NM_002010	13q11-q12
		fibroblast growth factor 10/FGF10	602115	602115 NM_004465	5p13-p12
		fibroblast growth factor 11/FGF11	601514	601514 NM_004112	17q21
Fibroblast		fibroblast growth factor 12/FGF12	601513	****	3928
L'IDI ODIASI		fibroblast growth factor 13/FGF13	300070	300070 NM_004114	Xq26.3

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	GIOWIE		fibroblast growth factor 14/FGF14	601515	601515 NM 004115	13034
	Factor		fibroblast growth factor 16/FGF16	603724	603724 NM 003868	*
			fibroblast growth factor 17/FGF17	603725	603725 NM 003867	8p21
			fibroblast growth factor 18/FGF18	603726	603726 NM 003862	*
			fibroblast growth factor 19/FGF19	603891	603891 NM_005117	****
		· · · · ·	fibroblast growth factor receptor			8p11.2-
			1/FGFR1	136350	****	p11.1
			fibroblast growth factor receptor 2			
			(bacteria-expressed kinase,			
			keratinocyte growth factor receptor,			
			craniofacial dysostosis 1, Crouzon		-	
		Receptors	syndrome, Pfeiffer syndrome, Jackson-		NM 00014	
			Weiss syndrome)/FGFR2	176943	, —	10q26
			fibroblast growth factor receptor 3			
			(achondroplasia, thanatophoric		NM 00524	
			dwarfism)/FGFR3	134934	7	4p16.3
			fibroblast growth factor receptor		NM_00201	
			4/FGFR4	134935	ı —	5q35.1-qter
			somatostatin transcription factor			
v th			1/STF1/homeodomain transcription			
ST O			factor/insulin promoter factor 1/IPF1	600733	600733 NM 000209	13q12.1
,		Biosynthesis	paired box gene 6/PAX6	106210	106210 NM_00028	11p13
			somatostatin/SST	182450	182450 NM 001048	3928
	Somatostatin		preprocortistatin/CORT	602784	602784 NM 001302	1p36
			Somatostatin receptor 1/G protein-			
			coupled/SSTR1	182451	182451 NM_001049	14q13
			Somatostatin receptor 2SSTR2	182452	182452 NM 001050	17q24

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	Recentors	Somatostatin recentor 3/adenyl analoga			
		Contracostatin receptor Diagenty eyerase			
		coupled/SS1K3	182453	182453 NM_001051	22q13.1
		Somatostatin receptor 4/SSTR4	182454	182454 NM_001052	20p11.2
		Somatostatin receptor 5/SSTR5	182455	182455 NM_001053	16p13.3
		somatostatin transcription factor			
		1/STF1/homeodomain transcription			
		factor/insulin promoter factor 1/IPF1	600733	600733 NM 000209	13q12.1
		insulin/INS	176730	176730 NM 000207	11p15.5
	Biosynthesis	sulfonylurea receptor  Biosynthesis (hyperinsulinemia)/SUR	605009	NM_00035	11p15.1
· .		beta-cell inward rectifier			
		subunit/BIR/potassium inwardly-	20000		•
		rectifying channel, subfamily J,	156000	785057	1.61411
		member 11/KCNJ11			
Inculia		carboxypeptidase E/CPE	114855	114855 NM_001873	Chr.4
THE		insulin receptor/INSR	147670	147670 NM_000208	19p13.2
		insulin receptor substrate 1/IRS1	147545	NM_00554 4	2q36
	Receptor	insulin receptor substrate 2/IRS2	600797	NM_00374 9	13q34
•		insulin receptor substrate 4/IRS4	603510	NM_00360 4	***
		amylin/diabetes-associated		MAY DOOM!	2 2 2 2
	Signaling	peptide/DAP/islet amyloid	147940	$147940   \frac{147940}{5}  $	12p12.3-
		polypeptide/LAPP		ſ	p12.1
	Metabolism	Metabolism insulin-degrading enzyme/IDE	146680	146680 NM_004969	10q23-q25
		insulin-like growth factor 1	147440	NASTON	12q22-
	Disconthacia	Biscomothacia (somatomedin C)/IGF1	14/440		q24.1

. :	DIVOJ II LII COLU	insulin-like arough factor 2			
		meaning more growin tactor 2			
		(somatomedin A)/IGF2	147470	147470 NM_000612	11p15.5
		insulin-like growth factor 1 receptor			
	Docontors	precursor/IGF1R	147370	147370 NM 000875	15q25-q26
	veceptors	insulin-like growth factor 2			2
		receptor/IGF2R	147280	147280 NM_000876	6q26
Insulin-Like		insulin-like growth factor binding prote 146730 NM_000596	146730	NM_000596	7p14-p12
Growth		insulin-like growth factor binding prote 146731	146731	M35410	2q33-q34
Factor		insulin-like growth factor binding prote 146732 NM_000598	146732	NM_000598	7p14-p12
		insulin-like growth factor binding prote 146733	146733	Y12508	17q12-q21
	Requisition	insulin-like growth factor binding prote 146734	146734	AF055033	2q33-q36
	931	insulin-like growth factor binding prote 146735	146735	M69054	12q13
		insulin-like growth factor binding prote 602867 NM_001553	602867	NM_001553	4q12
		connective tissue growth factor/CTGF/ 121009 NM_001901	121009	NM_001901	6q23.1
		insulin-like growth factor binding prote 602369 NM_001554	602369	NM_001554	1p22.3
		insulin-like growth factor binding prote 601489 NM_004970	601489	NM_004970	Chr. 16
	i	protease, serine, 11 (IGF			
	Catabolism	binding)/PRSS11	602194	602194 NM_002775 0q25.3-q26.2	0q25.3-q26.2
		angiopoietin 1/ANGPT1	601667	601667 NM_00114 6	8922
	Riosynthesis	angiopoietin 2/ANGPT2	601922	NM_00114	8p21
Angiopoietin			603874	NM_00467 3	***
		angiopoietin 4/ANGPT4	603705	AF113708	20p13
		angiopoietin 5/ANGPT5	****	AF152562	***
		protein receptor tyrosine kinase,		30000 744	
	Receptors	epithelial-specific 2/TIE2/TEK	600221	00045	9p21
		tyrosine kinase, endothelial/TEK			

		m [ndo] ndo - 1 1			
		piatetet-derived growin factor alpha			
		polypeptide/PDGFA	173430	173430 NM 002607	7p22
Diatolat.	Biosynthesis	Biosynthesis platelet-derived growth factor beta			
Derived		polypeptide (simian sarcoma viral (v-			
Growth		sis) oncogene homolog)/PDGFB	190040	190040 NM_0026082q12.3-q13.1	2q12.3-q13.
Factor		platelet-derived growth factor			
	Pecentore	receptor, alpha polypeptide/PDGFRA	173490	173490 NM_006206	4q12
	s loid annu	platelet-derived growth factor			
		receptor, beta polypeptide/PDGFRB	173410	173410 NM_002609	5q31-q32
		phosphodiesterase IA, calmodulin-			
		dependent/PDE1A	171890	171890 NM 005019	Chr.4
		phosphodiesterase 1B, calmodulin-			
		dependent/PDE1B	171891	171891 NM_000924	12q13
	-	phosphodiesterase IC, calmodulin-			
	Phosphodiest	Phosphodiest dependent/PDE1C	602987	602987 NM_005020	****
	erases	phosphodiesterase 3A, cGMP-			
		inhibited/PDE3A	123805	123805 NM_000921	11p15
		phosphodiesterase 3B, cGMP-			
		inhibited/PDE3B	602047	602047 NM_000922	11p15
		phosphodiesterase 5A, cGMP-	603310	NM_00108	9007
		specific/PDE5A	017700	3	7440
		protein kinase, AMP-activated, alpha 1 602739 NM_006251	602739	NM_006251	5p12
		protein kinase, AMP-activated, beta 1 r 602740 NM_006253	602740	NM_006253	12q24.1
	AMP.	protein kinase, AMP-activated, gamma 602742 NM_002733	602742	NM_002733	12q13.1
	Activated	protein kinase, AMP-activated, alpha		NM_00625	
	Protein	2 catalytic subunit/PRKAA2	600497	2	1p31
	Kinases	protein kinase, AMP-activated, beta 2	502741	NM_00539	***************************************
		non-catalytic subunit/PRKAB2	14/700		***

	protein kinase, Amir-activated,			
	gamma 2 non-catalytic	602743	* * *	7q35-q36
cGMP. Dependent	protein kinase, cGMP-dependent, regulatory, type I/PRKG1	176894	D45864	10q11.2
Protein Kinases	protein kinase, cGMP-dependent, type II/PRKG2	601591	NM_00625 9	4q13.1- q21.1
	protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1)/PRKAR1A	188830	NM_00273	17q23-q24
2 i.	protein kinase, cAMP-dependent, regulatory, type I, beta/PRKAR1B	176911	****	7pter-p22
cAMP-	protein kinase, cAMP-dependent, regulatory, type II, alpha/PRKAR2A	176910	NM_00415 7	3p21.3- p21.2
Protein Kinases	protein kinase, cAMP-dependent, regulatory, type II, beta/PRKAR2B	176912	176912 NM_00273	7922
	protein kinase, cAMP-dependent, catalytic, alpha/PRKACA	601639	601639 NM_00273	19p13.1
	protein kinase, cAMP-dependent, catalytic, beta/PRKACB	176892	NM_00273	1p36.1
	protein kinase, cAMP-dependent, catalytic, gamma/PRKACG	176893	NM_00273 2	9413
	guanine nucleotide binding protein (G protein), alpha 11 (Gq class)/GNA11	139313	NM_00206	19p13
	guanine nucleotide binding protein (G protein), alpha 13/GNA13	**	NM_00657 2	* * *
	guanine nucleotide-binding protein (G protein), alpha 14 /GNA14	* * * *	NM_00429	***
	guanine nucleotide binding protein (G protein), alpha 15 (Gq class)/GNA15	139314	NM_00206 8	19p13

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p11.21	16q13	9421	22q11.2	1pter-p31.2	7q21-q27	**	12p13	***	***	***	1p22	* * *	
139312 NM_00207 18p11.22- 1 p11.21	Y18213	600998 NM_00207	139160 NM_00207 22	***** 1pte	NM_00527 7q	176981 NM_00609	NM_00207 1	NM_00657 **	AF188177 **	****** NM_00448 **	600874 NM_00527	****** NM_00514 **	
139312	139311	866009	139160	139380	139390	176981	139130	* * * *	* * *	* * * * *	600874	****	
guanine nuclectide binding protein (G protein), alpha activating activity polypeptide L, olfactory type/GNAL	guanine nucleotide binding protein (G protein), alpha activating activity	guanine nucleotide binding protein (G protein), q polypeptide/GNAQ	guanine nucleotide binding protein (G protein), alpha z polypeptide/GNAZ	guanine nucleotide binding protein (G protein), beta polypeptide 1/GNB1	guanine nucleotide binding protein (G protein), beta polypeptide 2/GNB2	guanine nucleotide binding protein (G protein), beta polypeptide 2-like 1/GNB2L1/RACK1	guanine nucleotide binding protein (G protein), beta polypeptide 3/GNB3	guanine nucleotide binding protein (G protein), beta 5/GNB5	guanine nucleotide binding protein (G protein), gamma 3/GNG3	guanine nucleotide binding protein (G protein), gamma 4/GNG4	guanine nucleotide binding protein (G protein), gamma 5/GNG5	guanine nucleotide binding protein (G protein), gamma 7/GNG7	
						G-Proteins							
										Cocon	Messengers		

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	guanine nucleotide binding protein (G protein), gamma 8/GNG8	* * *	AF188179	*
	guanine nucleotide binding protein (G protein), gamma 10/GNG10	***	NM_00412 5	****
	guanine nucleotide binding protein (G protein), gamma 11/GNG11	* * *	NM_00412 6	*****
	guanine nucleotide binding protein (G protein), gamma 12/GNG12	* * * * *	AF188181	****
	guanine nucleotide binding protein (G		NM 00051	
	protein), alpha stimulating activity polypeptide 1/GNAS1	139320	9	20q13.2
	guanine nucleotide binding protein (G		NM 00206	
	protein), alpha inhibiting activity polypeptide 1/GNAI1	139310	6	7q21
G-Protein	guanine nucleotide binding protein (G		7000 MM	
Modulators	protein), alpha inhibiting activity nolvoentide 2/GNA12	139360	0	3p21
	guanine nucleotide binding protein (G		00000	
	protein), alpha inhibiting activity	139370	MINI_000049	1p13
	polypeptide 3/GNAI3		0	
	guanine nucleotide binding protein (G			
	protein), alpha inhibiting activity polypeptide H/GNAIH	139180	****	12p13-p12
Protein	y-src ayian sarcoma (Schmidt-Ruppin		NM 00541	
Tyrosine Kinases	A-2) viral oncogene homolog/SRC	190090	7	20q12-q13
	protein kinase C alpha/PRKCA	176960	NM_00273	17q22- q23.2
	protein kinase C beta/PRKCB	176970	X06318	16p11.2

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er protein kinase C, epsilon/PRKCE protein kinase C gamma/PRKCG protein kinase C, iota/PRKCI protein kinase C, mu/PRKCM protein kinase C, theta/PRKCZ protein kinase C, zeta/PRKCZ protein phosphatase 3, catalytic subunit A, alpha isoform/PPP3CB protein phosphatase 3, catalytic subunit B, alpha isoform/PPP3CB protein phosphatase 3, regulatory subunit B, alpha isoform/PPP3CB mitogen activated protein kinase PRKM1/MAPK1/ERK2 mitogen activated protein kinase PRKM4/MAPK4 mitogen activated protein kinase PRKM4/MAPK4 mitogen activated protein kinase PRKM6/MAPK6 mitogen activated protein kinase PRKM6/MAPK7 mitogen activated protein kinase PRKM6/MAPK7	Calcium-	protein kinase C, delta/PRKCD	176977	NM_00625 4	3p
	and	10/144/	17075	NM_00540	
4 m	Diacyigiyeer	protein kinase C, epsilon/PKKCE	1/69/1	O	2p21
4 m	ol-Activated	protein kinase C gamma/PRKCG	176980	*** ***	19q13.4
4	Protein	protein kinase C, iota/PRKCI	300094	300094 NM_002740	Xq21.3
600448 176982 176982 114106 114106 176948 601795 602904 602521	Kinases	protein kinase C, mu/PRKCM	*****	***** NM 002742	****
A 114105 A 114106 116982 3 601302 601795 602904 602904				NM_00625	
176982 114106 114106 1176948 176949 602904 602521		protein kinase C, theta/PRKCQ	600448	7	10p15
A 114105 A 114106 114106 3 601302 601795 602904 602521				NM_00274	
A 114105 114106 3 601302 176948 601795 602904 602521		protein kinase C, zeta/PRKCZ	176982	4	***
A 114105 114106 3 601302 176948 601795 602904 602521		protein phosphatase 3, catalytic			
3 601302 176948 601795 176949 602904 602521	Calmodulin-	subunit A, alpha isoform/PPP3CA	114105	M29550	4q21-q24
3 601302 176948 601795 176949 602904 602521		protein phosphatase 3, catalytic			
3 601302 176948 601795 176949 602904 602521	Protein	subunit A, beta isoform/PPP3CB	114106	M29551	10q21-q22
subunit B, alpha isoform/PPP3CB 601302 mitogen activated protein kinase PRKM1/MAPK1/ERK2 mitogen activated protein kinase PRKM3/MAPK3/ERK1 mitogen activated protein kinase PRKM4/MAPK4 mitogen activated protein kinase PRKM6/MAPK6 mitogen activated protein kinase PRKM7/MAPK7 mitogen activated protein kinase mitogen activated protein kinase mitogen activated protein kinase pRKM7/MAPK7	Phosphatase	protein phosphatase 3, regulatory			
mitogen activated protein kinase PRKM1/MAPK1/ERK2 mitogen activated protein kinase PRKM3/MAPK3/ERK1 mitogen activated protein kinase PRKM4/MAPK4 mitogen activated protein kinase PRKM6/MAPK6 mitogen activated protein kinase	S	subunit B, alpha isoform/PPP3CB	601302	***	2p16-p15
mitogen activated protein kinase PRKM3/MAPK3/ERK1 mitogen activated protein kinase PRKM4/MAPK4 mitogen activated protein kinase PRKM6/MAPK6 mitogen activated protein kinase mitogen activated protein kinase PRKM7/MAPK7 mitogen activated protein kinase		mitogen activated protein kinase PRKM1/MAPK1/ERK2	176948	NM_00274 5	22q11.2
mitogen activated protein kinase PRKM4/MAPK4 mitogen activated protein kinase PRKM6/MAPK6 mitogen activated protein kinase PRKM7/MAPK7 mitogen activated protein kinase		mitogen activated protein kinase PRKM3/MAPK3/ERK1	601795	X60188	16p11.2
mitogen activated protein kinase  PRKM6/MAPK6 mitogen activated protein kinase  PRKM7/MAPK7 mitogen activated protein kinase		mitogen activated protein kinase PRKM4/MAPK4	176949	NM_00274 7	18q12-q21
mitogen activated protein kinase 602521 PRKM7/MAPK7 mitogen activated protein kinase		mitogen activated protein kinase PRKM6/MAPK6	602904	NM_00274 8	***
mitogen activated protein kinase		mitogen activated protein kinase PRKM7/MAPK7	602521	NM_00274 9	17p11.2
JNK1/PRKM8/MAPK8		mitogen activated protein kinase JNK1/PRKM8/MAPK8	601158	L26318	***

Growth
Control
(additional
genes in
Oncology)

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	Kinases	mitogen activated protein kinase JNK2/PRKM9/MAPK9	602896	65760U	56p3
		mitogen activated protein kinase JNK3/PRKM10/MAPK10	602897	U35003	* * *
		mitogen activated protein kinase PRKM11/MAPK11	602898	AF031135	* * * *
<u> </u>		mitogen activated protein kinase SAPK3/MAPK12	602399	NM_00296 9	22q13.3
		mitogen activated protein kinase PRKM13/MAPK13	602899	NM_00275 4	* * *
		mitogen activated protein kinase SAPK2A/MAPK14	600289	NM_00131 5	6p21.3- p21.2
		BCL2	151430	M13994	18q21.3
		BCL-X/BCLX	600039	Z23115	***
					19q13.3-
		BCL2 associated protein/BAX	600040	L22473	q13.4
				NM_00118	6p21.3-
		BCL2-antagonist/killer 1/BAK1	600516	8	p21.2
				NM_00432	
		BCL2-associated athanogene 1/BAG1	601497	3	9p12
				NM_00428	
		BCL2-associated athanogene 2/BAG2	603882	7	***
		BCL2-associated athanogene 3/BAG3	603883	AF095193	***
		BCL2-associated athanogene 4/BAG4   603884	603884	AF095194	****
		5	603885	AF095195	****
		BCL-X/BCL-2 binding protein/BAD	291609	603167 AF021792	***
		BCL2-like 1/BCL2L1	620009	NM_00119	***
				NIM DOZOS	- 1
		BCL2-like 2/BCL2L2	601931	0	14q11.2- q12
					_

BCL2-like 11 (apoptosis		NM 00653	
facilitator)/BCL2L11	603827	)   «	****
BCL2-related protein A1/BCL2A1	601056	Y09397	15924.3
BCL2-interacting protein		NM_00380	
harikari/HRK	603447	9	****
BCL-2 interacting killer/BIK	603392	U34584	****
v-raf-1 murine leukemia viral		NM 00288	
oncogene homolog 1/RAF1	164760	0	3p25
tumor protein p53/TP53	191170	X02469	17p13.1
superfamily, member		NM_00004	
6/FAS/TNFRSF6	134637	ĸ	10q24.1
nuclear factor kappa-B DNA binding subunit 1/NFKB1	164011	M58603	4q23-q24
nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250 2	10q24
apoptosis-related cystein protease			11q22.2-
1/caspase 1/CASP1	147678	L27475	q22.3
apoptosis-related cystein protease			
1/caspase 1/CASP2	600093	****	7q35
apoptosis-related cystein protease		NM 00434	4q35, 4q33.
1/caspase 1/CASP3	600636	9	q35.1
apoptosis-related cystein protease		NM_00434	11q22.2-
1/caspase 1/CASP4	602664	7	q22.3
apoptosis-related cystein protease		NM_00434	11q22.2-
1/caspase 1/CASP5	602665	7	q22.3
apoptosis-related cystein protease		NM_00122	
1/caspase 1/CASP6	601532	9	4q25-q25
apoptosis-related cystein protease		NM_00122	10q25.1-
1/caspase 1/CASP7	601761	7	q25.2
	•		

Apoptosis

	-	apoptosis-related cystein protease		NM 00122	
		1/caspase 1/CASP8	601763	. ∞	2033-034
		apoptosis-related cystein protease			i ch coha
		1/caspase 1/CASP9	602234	***	****
		apoptosis-related cystein protease		NM_00123	
		1/caspase 1/CASP10	601762	0	2q33-q34
		apoptosis-related cystein protease		NM_00372	
·		1/caspase 1/CASP13	603653	e e	***
		ADP-ribosyltransferase (NAD+; poly			
	·	(ADP-ribose)		NM_00161	
	·	polymerase)/PARP/ADPRT	173870		1q42
		poly (ADP-ribose)		NM_00363	
		glycohydrolase/PARG	603501	1	10q11.23
٠		ovelin-denendant bings (CVC)	116067	62100_MM	
		cyclin-dependent Aniase (CDAZ)	110933	×	12q13
		cyclin-dependent kinase (CDK3)	123828	NM_00125 8	17q22-qter
	·	cvclin-dependent kinase (CDK4)	123820	NM_00007	12014
		Commence (Contract)	120021		12414
		cyclin-dependent kinase (CDK5)	123831	NM_00493	7626
				NM 00125	
		cyclin-dependent kinase (CDK6)	603368	,6	7q21-q22
				NM_00315	
		cyclin-dependent kinase (CDK7)	601955	7	2p15-cen
				NM_00126	
		cyclin-dependent kinase (CDK8)	603184	0	13q12
				NM_00126	
		cyclin-dependent kinase (CDK9)		1	9q34.1
Cell Cycle	Cell Cycle	E2F transcription factor 1/E2F1	189971	M96577	20q11.2

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					NM 00409	
			E2F transcription factor 2/E2F2	600426		1p36
			E2F transcription factor 3/E2F3	600427	NM_00194 9	6p22
					NM 00195	
			E2F transcription factor 4/E2F4	6000659	۱0	16q22.1
			HOE transministra forces 6/2015	2000	NM_00195	l
			EZE Hallscription factor 3/EZF3	00000		***
					NM_00195	
			E2F transcription factor 6/E2F6	602944	2	***
			transcription factor Dp-1 (E2F		NM 00711	
			dimerization partner 1)/TFDP1	189902	,	13934
			transcription factor Dp-2 (E2F		NM 00628	
	٠		dimerization partner 2)/TFDP2	602160	9	3q23
-			proliferating cell nuclear		NM 00259	
			antigen/PCNA	176740	2	20p12
					NM 00464	
			sapiens nephrin/NPHN	602716	9	19q13.1
	Adhesion	Adhesion	Vrosine kinase with immunoglobulin		NM 00542	
			and epidermal growth factor homology 600222 domains/TIE1	600222	4	1p34-p33
			HMGCoA reductase/HMGCR	142910	142910 NM 000859 5q13.3-q14	5q13.3-q14
			3-hydroxy-3-methylglutaryl-			
			Coenzyme A synthase 1	142940	142940 NM_002130	5p14-p13
			squalene synthetase/arnesyl-			
			diphosphate farnesyltransferase	184420	184420 NM_004462 8p23.1-p22	8p23.1-p22

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19/8RD5A1   184753 NM 001047			steroid-5-alpha-reductase, alpha			
delta 4-dehydrogenase alpha  1)/SRD5A1  steroid-5-alpha-reductase, alpha polypeptide 2 (3-oxo-5 alpha-steroid delta 4-dehydrogenase alpha 2)/SRD5A2  Anabolism steroidogenic acute regulatory protein/STAR cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydrogenase, 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, member 1/SULT2A1 UDP glycosyltransferase family 2, member 1/GUP 2017 172 10			polypeptide 1 (3-oxo-5 alpha-steroid			
steroid-5-alpha-reductase, alpha steroid-5-alpha-reductase, alpha steroid-5-alpha-reductase, alpha polypeptide 2 (3-oxo-5 alpha-steroid delta 4-derydrogenase alpha 2)/SRD5A2  Anabolism steroidogenic acute regulatory protein/STAR cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 2 beta- and steroid dehydropepiandrosterone (DHEA)-preferring sulfotransferase, family 2A, member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, or member 1/2012			delta 4-dehydrogenase alpha	<del></del>		
Anabolism  Steroid-5-alpha-reductase, alpha  polypeptide 2 (3-oxo-5 alpha-steroid delta 4-dehydrogenase alpha 2)/SRD5A2  Anabolism  steroidogenic acute regulatory protein/STAR  cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A  cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydrogenase, 3 beta- and steroid delta-isomerase 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, comban BAITGTDA			1)/SRD5A1	184753	NM 001047	5p15
polypeptide 2 (3-oxo-5 alpha-steroid delta 4-dehydrogenase alpha 2)/SRD5A2  Anabolism steroidogenic acute regulatory protein/STAR cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenasa, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydroepiandrosterone (DHEA)-preferring sulfotransferase, family 2A, member 1/SULT2A1 estrogen-preferring  UDP glycosyltransferase family 2, or anaber BAATGTTDA			steroid-5-alpha-reductase, alpha			
Anabolism steroidogenic acute regulatory protein/STAR cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydroepiandrosterone (DHEA)-preferring sulfotransferase, family 2A, member 1/SULT2A1 estrogen-preferring  UDP glycosyltransferase family 2, nomber BAHTSTAN			polypeptide 2 (3-oxo-5 alpha-steroid			
Anabolism steroidogenic acute regulatory protein/STAR cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 3 beta- and steroid dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, promber BAH 1572BA			delta 4-dehydrogenase alpha			
Anabolism steroidogenic acute regulatory protein/STAR cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 1/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, 10DP glycosyltransferase family 2, 10DP glycosyltransferase family 2, 100067			2)/SRD5A2	264600	NM_000348	2p23
cytochrome P450, subfamily XIA cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 3 beta- and steroid dehydrospiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, 191740		Anabolism	steroidogenic acute regulatory	17000	NM 00034	
cytochrome P450, subfamily XIA (cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 2/HSD3B1 hydroxy-delta-5-steroid dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, 100067			protein/STAR	7 10000	0	2011.Z
cholesterol side chain cleavage)/CYP11A cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 2/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase family 2, UDP glycosyltransferase family 2, member DAA INCETERA			cytochrome P450, subfamily XIA		00000	
cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydropenase, 2/HSD3B1 hydroxy-delta-5-steroid dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 UDP glycosyltransferase family 2, 600067			(cholesterol side chain	118485	NM_000/8	15a23-a24
cytochrome P450, subfamily XVII  (steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 UDP glycosyltransferase family 2, 600067			cleavage)/CYP11A		_	-
(steroid 17-alpha-hydroxylase), adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 3 beta- and steroid dehydrogenase, 2/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 UDP glycosyltransferase family 2, member BAATTCT2BA	General		cytochrome P450, subfamily XVII		01000	
adrenal hyperplasia/CYP17 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 delta-isomerase 2/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 UDP glycosyltransferase family 2, 600067	Steroid	,	(steroid 17-alpha-hydroxylase),	202110	01000_MM	10q24.3
hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 UDP glycosyltransferase family 2, 600067	Hormone		adrenal hyperplasia/CYP17		7	•
dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 UDP glycosyltransferase family 2, comber BAH GETSBA	Metabolism		hydroxy-delta-5-steroid		SOOO FAIR	
delta-isomerase 1/HSD3B1 hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 UDP glycosyltransferase family 2, 600067	(additional		dehydrogenase, 3 beta- and steroid	109715	00000_MINI	1p13.1
hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2 dehydroepiandrosterone (DHEA)- preferring sulfolransferase, family 2A, 125263 member 1/SULT2A1 estrogen-preferring UDP glycosyltransferase 1/UGT1 191740 UDP glycosyltransferase family 2, 600067	genes in		delta-isomerase 1/HSD3B1		7	ţ
a- and steroid 201810 D3B2 ne (DHEA)- srase, family 2A, 125263 ase 1/UGT1 191740 ase family 2, 600067	Toxicology)		hydroxy-delta-5-steroid		01000	
D3B2  ne (DHEA)- srase, family 2A, 125263  ase 1/UGT1 191740  ase family 2, 600067			dehydrogenase, 3 beta- and steroid	201810	61000 MINI	1p13.1
ne (DHEA)- srase, family 2A, 125263 ase 1/UGT1 191740 ase family 2, 600067	<del></del>		delta-isomerase 2/HSD3B2		٥	
ase 1/UGT1 191740 ase family 2, 600067			dehydroepiandrosterone (DHEA)-		21,000 MIN	
ase 1/UGT1 191740 ase family 2, 600067			preferring sulfotransferase, family 2A,	125263	1NIM_00510	19q13.3
ase 1/UGT1 ase family 2,			member 1/SULT2A1		`	•
ase 1/UGT1 ase family 2,			estrogen-preferring	600043	NM 005420	4q13.1
ase family 2,			UDP glycosyltransferase 1/UGT1	191740	NM_00107 2	Chr. 12
		Cotobolica	UDP glycosyltransferase family 2, member B4/UGT2B4	290009	NM_00107	4q13

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	* Catabolism #				
			890009	NM_00107 4	1914
	·	UDP glycosyltransferase 2 family, polypeptide B11/UGT2B11	603064	603064 NM_00107	***
		UDP glycosyltransferase family 2, member B15/UGT2B15	690009	600069 NM_00107	4q13
-		UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107	1914
		acetyl-Coenzyme A carboxylase alpha/ACACA	200350	NM_00066 4	17q21
-		acetyl-Coenzyme A carboxylase beta/ACACB	601557	NM_00109	12q24.1
		acetyl-Coenzyme. A acetyltransferase 1 (acetoacetyl Coenzyme A thiolase)/ACAT1	203750	NM_00001	11q22.3- q23.1
	Biosynthesis	acetyl-Coenzyme A acetyltransferase 2 (acetoacetyl Coenzyme A thiolase)/ACAT2	100678	NM_00589	6q25.3-q26
		ATP citrate lyase/ACLY	108728	NM_00109 6	17q21.1
		glycerol-3-phosphatė acyltransferase, mitochondrial/GPAM1	602395	* * * *	10q24-q26
<u>-</u> !!		fatty acid synthase/FASN	600212	NM_00410 4	17q25
		apolipoprotein A1 of HDL/APOA1	107680	107680 NM 000039	11923
		apolipoprotein A2/APOA2	107670	107670 NM_001643	1q21-q23
		apolipoprotein A4/APOA4	107690	107690 NM 000482	11q23
		apolipoprotein B (including Ag(x) antigen)/APOB	107730	107730 NM 000384	2n24

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	apolipoprotein B mRNA editing		_	
	enzyme, catalytic polypeptide	600130	600130 NM 005889	9 12p13.1
	APOBEC1 binding			1
	protein/ABBP1/heterogeneous nuclear			
	ribonucleoprotein A/B/HNRPAB	602688	602688 NM 004499	*****
Transport	apolipoprotein C1/APOC1	107710	107710 NM 001645	5 19q13.2
	apolipoprotein C2/APOC2	207750	207750 NM_000483	3 19q13.2
	apolipoprotein C3/APOC3	107720	107720 NM_000040	0 11q23
	apolipoprotein C4/APOC4	600745	600745 NM_001646	6 19913.2
	apolipoprotein D/APOD	107740	107740 NM_001647	7 3q26.2-qter
	apolipoprotein E/APOE	107741	107741 NM_000041	1 19q13.2
	apolipoprotein F/APOF	107760	107760 NM 001638	8 Chr.12
	apolipoprotein H (beta-2-glycoprotein			
	I)/APOH	138700	138700 NM_000042	2 17q23-qter
	apolipoprotein J/clustrin/APOJ/CLU	185430	185430 NM 001831	l 8p21-p12
	apolipoprotein L/APOL	603743	AF019225	<u> </u>
	pancreatic triglyceride lipase/PNLIP	246600	AH003527	10q26.1
	enterostatin/colipase, pancreatic/CLPS	120105	120105 NM 001832	9 6pter-p21.1
	high density lipoprotein			
	receptor/CD36 antigen (collagen type I			
	receptor, thrombospondin receptor)-		NM 00550	
	like 1/CD36L1/SRB1	601040	ري ا	Chr. 12
	cubilin (intrinsic factor-cobalamin	602997	NM_00108	10n12 1
	receptor) precursor/CUBN		1	1.71001
	tein/CI	600046	600046 NM 005502	9q22-q31
	low density lipoprotein receptor			
	(familial hypercholesterolemia)/LDLR   143890 NM 000527 9p13.2-p13.1	143890	NM_000527	9p13.2-p13.1
	law density lipoprotein receptor-			
- <b></b>	related protein 1/LRP1	107770	NM_002332	107770 NM_002332 2q13.1-q13.3

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		low density lipoprotein receptor-			
		related protein 2/LRP2	600073	U33837	2q24-q31
	Uptake	low density lipoprotein receptor-			
		related protein 5/LRP5	603506	AF077820	11q13.4
		low density lipoprotein receptor-			
		related protein 8/LRP8	602600	602600 NM 004631	1p34
		low density lipoprotein receptor-			
		related protein-associated protein	104225	104225 NM 002337	4p16.3
		oxidized low density lipoprotein			
		receptor/OLR1	602601	602601 NM_002543	12p13-p12
		very low density lipoprotein			
		receptor/VLDLR	192977	192977 NM 003383	9p24
		microsomal triglyceride transfer			
•		protein large subunit/MTP	157147	157147 NIM_000253	4q22-q24
		sortilin related receptor/SORL1	602005	602005 NM_003105 1q23.2-q24.2	1q23.2-q24.
		plasma cholesterol ester transfer			
		protein/CETP	118470	118470 NM_000078	16q21
		phospholipid transfer protein/PLTP	172425	172425 NM_006227 20q12-q13.	20q12-q13.1
Lipid	Storage	glycerol-3-phosphate acyltransferase,			
Metabolism	25.00	mitochondrial/GPAM1	602395	****	10q24-q26
		lipoprotein lipase/LPL	238600	238600 NM_000237	8p22
		lipase, hepatic/LIPC	151670	151670 NM_00023	15q21-q23
		adrenergic, beta-3-, receptor/ADRB3	169601	109691 NM_000025 8p12-p11.2	8p12-p11.2
	Release	lysosomal acid lipase/LIPB	278000	278000 NM_000235 10924-925	10q24-q25
		lipase, hormone-sensitive/LIPE	151750	151750 NM_005357 9q13.1-q13	9q13.1-q13.
		perilipin/PLIN	170290	170290 NM_002666	15q26
		fatty acid binding protein 4,			
- <b></b>		adipocyte/FABP4	600434	600434 NM_001442	8q21
-					1

	Fatty acid CoA Ligase, long chain	152425	****	2013
	1/FACL1	135753		cipe
		152426	**	4q34-q35
Coenzyme A Ligases	Fatty acid CoA Ligase, long chain 3/FACL3	602371	NM_00445	2q34-q35
	Fatty acid CoA Ligase, long chain 4/FACLA	300157	NM_00445 8	Xq22.3
	Fatty acid CoA Ligase, very long chain 1/FACVL1	603247	NM_00364 5	15q21.2
Ketogenesis	Ketogenesis Coenzyme A synthase 2	600234	NM_00551 8	1p13-p12
	acyl-Coenzyme A dehydrogenase, long 201460 NM_001608	201460	NM_001608	2q34-q35
	acyl-Coenzyme A dehydrogenase, C-4   201450 NM 000016	201450	NM_000016	1p31
	acyl-Coenzyme A dehydrogenase, C-2   201470 NM 000017	201470	NM_000017	12q22-qter
	carnitine palmitoyltransferase I, liver,			ı
	nuclear gene encoding mitochondrial			
	protein/CPT1A	600528	600528 NM_001876	11q13
	camitine palmitoyltransferase II,			
	nuclear gene encoding mitochondrial			
	protein/CPT2	059009	600650 NM 000098	1p32
	carnitine/acylcarnitine	212138	212138 NM_000387	3p21.31
	enoyl-CoA, hydratase/3-hydroxyacyl	261515	NM_00196	
	CoA dehydrogenase/EHHADH	201010	9	/7bc
	hydroxyacyl-CoA dehydrogenase/3-		0.000	
	ketoacyl-CoA thiolase/enoyl-CoA	068009	NM_00018	2p23
	hydratase, alpha subunit/HADHA		7	

β-Oxidation	hydroxyacyl-CoA dehydrogenase/3- ketoacyl-CoA thiolase/enoyl-CoA hydratase, beta subunit/HADHB	143450	143450 NM_00018	2p23
·	acyl-Coenzyme A oxidase 1/ACOX1 (peroxisomal)	264470	264470 NM_00403	17q25
·	acyl-Coenzyme A oxidase 2, branched chain/ACOX2 (peroxisomal)	601641	NM_00350 0	3p14.3
	acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain precursor/ACADS (mitochondrial)	201470	NM_00001	12q22-qter
	acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain/ACADM (mitochondrial)	201450	201450 NM_00001 6	1p31
	acyl-Coenzyme A dehydrogenase, long chain/ACADL (mitochondrial)	201460	09100_MN 8	2q34-q35
	hydroxyacyl-Coenzyme A dehydrogenase, type II/HADH2	602057	NM_00449 3	****
	enoyl-Coenzyme A hydratase 1/ECH1 (peroxisomal)	969009	NM_00139 8	19q13
	cystathionine-beta-synthase/CBS	236200	NM_00007 1	21q22.3
	cubilin (intrinsic factor-cobalamin receptor) precursor/CUBN	602997	602997 NM_00108	10p12.1
Homocystein	betaine-homocysteine S- Homocystein methyltransferase/BHMT	602888	NM_00171 3	****
e Metabolism	e 5-methyltetrahydrofolate- Metabolism homocysteine			
	methyltransferase/methionine	156570	156570 NM_000254	1q43
	S-adenosylhomocysteine hydrolase/AHCY	180960	M61832	20cen-q13.1

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			methylenetetrahydrofolate			
			reductase/MTHFR	236250	AH007464	1p36.3
	Purine	Durine	adenosine monophosphate deaminase i (isoform M)/AMPD1	102770	NM_00003 6	1p21-p13
	Nucleotide Cycle	Nucleotide Cycle	adenylosuccinate synthase/ADSS	103060	NM_00112 6	lcen-q12
			adenylosuccinate lyase/ADSL	103050	NM_00002 6	22q13.1
			sarcoglycan, delta (35kD dystrophin-associated glycoprofein)/SGCD	601411	NM_00033	5q33
			phospholamban/PLN	172405	NM_00266	6q22.1
			desmin/DES	125660	NM_00192	2q35
			cofilin 2 (muscle)/CFL2	601443	****	Chr. 12
		Structural	myosin heavy chain 7, cardiac muscle, beta/MYH7	160760	NM_00025	14q12
		and Contractile	cardiac myosin binding protein C/MYBPC3	600958	NM_00025 6	11p11.2
		Proteins	tropomyosin 1 (alpha)/TPM1	191010	NM_00036 6	15q22.1
			troponin C, slow/TNNC1	191040	NM_00328 0	3p21.3- p14.3
	Cardiac Muscle		troponin I, cardiac/TNNI3	191044	NM_00036	19q13.4
-	Function		troponin T2, cardiac/TNNT2	191045	NM_00036 4	1932
			elastin (supravalvular aortic stenosis, Williams-Beuren syndrome)/ELN	130160	130160 NM_00050	7q11.2

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		ATPase, Ca++ transporting, cardiac	108730	M23114	16n12
		muscle, fast twitch 1/ATP2A1	2001	+1162141	71001
	Sarcoplasmi	ATPase, Ca++ transporting, cardiac muscle, slow twitch 2/ATP2A2	108740	NM_00168	12q23- q24.1
	Function		180902	NM_00103 5	1q42.1-q43
		calsequestrin 2, fast twitch cardiac muscle/CASQ2	114251	NM_00123 _2	1p13.3-p11
		mitochondrial tRNA-Leu (UUR)	590050	S55822	mitociionati
Cardiac	Mitochondr	Mitochondri tafazzin (cardiomyopathy, dilated 3A		1 0000 J. H.	
Muscle	al Function	al Function (X-linked); endocardial fibroelastosis	300069	11000_MINI	Xq28
Structure		2; Barth syndrome/TAZ		,	
and	Receptors	focal adhesion kinase/FAK/PTK2 prote 600758 NM_005607	85/009	NM_005607	8q24-qter
Metabolism	·	sapiens potassium inwardly-rectifying   600681 NM_000891	189009	NM_000891	Chr. 17
		G-protein coupled inwardly rectifying			
		potassium channel/GIRK/potassium	601534	KO1534 NM_00223	1 7000
	Chonno	inwardly-rectifying channel, subfamily	+66100	6	4424·1
	Cuamers	J, member 3/KCNJ3			
		ATP sensitive potassium inwardly-		ONTA DOUGO	
	·.	rectifying channel, subfamily J,	600734	600734 TATAL_00097	11q24
		member 5/KCNJ5		0	
	7	v-Ha-ras Harvey rat sarcoma viral	100000	NM_00534	
		oncogene homolog/HRAS	120020	3	c.c1q11
		v-Ki-ras2 Kirsten rat sarcoma 2 viral	100070	100070 NM_00498	17-17 1
		oncogene homolog/KRAS2	1900/0	5	1.2p12.1
		neuroblastonia RAS viral (v-ras)	164700	NM_00252	12127
		oncogene homolog/NRAS	104/20	4	7.C1d1
		ras-related C3 botulinum toxin substrat 602048 NM_006908 Xq26.2-27.2	602048	806900 MIN	Xq26.2-27.2
		ras-related C3 botulinum toxin substrat 602049 NM 00287222q12.3-q13.2	602049	VM 002872	2q12.3-q13.

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Response to		ras-related C3 botulinum toxin substrat	602050	NM_00505	17q24-qter
Stress	Signaling	LIM domain kinase 1/LIMK1	601329	NM_00231 4	7q11.23
		LIM domain kinase 2/LIMK2	601988	00556 9	22q12
		cell division cycle 42 (GTP-binding pro	116952	NM_00179 1	1p36.1
		p21/Cdc42/Rac1-activated kinase 1 (yeast Ste20-related)/PAK1	602590	NM_00257 6	11q13-q14
		protein kinase C-like 2/PRKCL2/RAK2	602549	NM_00625 6	* * *
		oligopherin/OPHN3/p21 (CDKN1A)-activated kinase 3/PAK3	300142	NM_00257 8	Xq21.3-q24
	·	cardiac-specific homeo box/CSX	600584	NM_00438 7	5q34
	Transcription Ractors	Transcriptio GATA-binding protein 4/GATA4	925009	NM_00205 2	8p23.1-p22
		serum response factor (c-fos serum response element-binding transcription 600589 factor)/SRF	685009	NM_00313	*
		granulocyte-macrophage colony stimulating factor 2/CSF2	0968E1	NM_00075 8	5q31.1
		macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
	Growth	granulocyte colony stimulating factor 3/CSF3	138970	138970 NM_00075	17q11.2- q12
	Factors	erythropoictin/EPO	133170	133170 NM_00079	7q21

	•	fit3 ligand/FMS-related tyrosine kinase 3 ligand/FLT3LG	600007	U03858	19q13.3
		thrombopoietin (MLV oncogene ligand, megakaryocyte growth and development factor)/THPO	600044	600044 NM_00046	3926.3-927
		granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA	306250	NM_00614 0	Xp22.32
		granulocyte-macrophage colony stimulating factor 2 receptor, beta/CSF2RB	138981	U18373	22q12.2- q13.1
Erythropoies is	Receptors	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y chromasomal/CSF2RY	425000	**	Yp11
		erythropoietin receptor/EPOR	133171	NM_00012 1	19p13.3- p13.2
		colony stimulating factor 1 receptor/CSFR1	164770	U63963	5q33.2- q33.3
		myeloproliferative leukemia virus oncogene/MPL/thrombopoietin receptor/TPOR	159530	159530 NM_00537	1p34
		Janus kinase 2 (a protein tyrosine kinase)/JAK2	147796	147796 NM_00497	9p24
		STAM-like protein containing SH3 and ITAM domains 2/STAM2	* * * *	***** NM_00584	***
	Signaling, Transcriptio	ribosomal protein S7/RPS7	603474	NM_00101	19q13.2
	n, and Translation	n, and signal transducer and activator of Translation transcription 5A/STAT5A	601511	601511 NM_00315	17q11.2

		Factors	BCL-X/BCLX	600039	Z23115	***
·			STAT induced STAT inhibitor 3/SSI-	604176	NM_00395 5	***
			FMS-related tyrosine kinase 3/FLT3	136351	NM_00411 9	13q12
			ATP-binding cassette 7 iron transporter/ABCB7	300135	NM_00429 9	Xq13.1- q13.3
		Iron Uptake	macrophage protein 2/NRAMP2/solute carrier family 11,	600523	AB015355	12q13
			transferrin/TF	190000	NM_00106	3q21
	•		transferrin receptor (p90, CD71)/TFRC	190010	NM_00323 4	3929
			transferrin receptor 2/TFR2	* * * *	NM_00322	***
Erythrocyte Production		Iron Transport	iron-responsive element-binding protein 1/iron regulatory protein 1 (IRE-BP1/IREB1	147581	M58511	Chr.9
Maintenance			iron-responsive element-binding protein 2/iron regulatory protein 2 (IRE-BP1/IREB2	147582	M58510	Chr.15
			ferritin, light polypeptide/FTL	134790	NM_00014 6	19q13.3- q13.4
			ferritin, heavy polypeptide 1/FTH1	134770	NM_00203	11912-913
			aminolevulinate, delta-, synthase 1, nuclear gene encoding mitochondrial protein/ALAS1	301300	NM_00068 8	Xp11.21
		- 1	4czf01xls			ă ă
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		aminolevulinate, delta-, synthase 2 (sideroblastic/hypochromic anemia), nuclear gene encoding mitochondrial orotein/ALAS2	125290	125290 NM_00003	3p21.1
		dehydratase/ALAD	125270	NM_00003 1	9434
	Нете	uroporphyrinogen III synthase (congenital erythropoietic porphyria)/UROS	263700	263700 NM_00037	10q25.2- q26.3
Heme	Synthesis	uroporphyrinogen decarboxylase/UROD	176100	NM_00037 4	1p34
		porphobilinogen deaminase/PBGD	176000	AH002926	11q23.3
		protoporphyrinogen oxidase, nuclear gene encoding mitochondrial protein/PPOX	600923	000030 9	1922
		coproporphyrinogen oxidase (coproporphyria, harderoporphyria), nuclear gene encoding mitochondrial protein/CPO	121300	121300 NM_00009	3q12
		ferrochelatase (protoporphyria), nuclear gene encoding mitochondrial protein/FECH	177000	177000 NM_00014	18q21.3
		hemoglobin, alpha 1/HBA1	141800	NM_00051	16pter- p13.3
	Hemoglobin Synthesis	hemoglobin, alpha 2/HBA2	141850	NM_00055 8	16pter- p13.3
		hemoglobin, beta/HBB	141900	NM_00051 8	11p15.5

	serum beta-glycoprotein hemopexin/HPX	142290	142290 AH002827	11p15.5- p15.4
	inducible heme oxygenase (decycling)	141250	NM_00213	22q12
	constitutive heme oxygenase (decycling) 2/HMOX2	141251	NM_00213 4	16p13.3
Heme		191740	191740 NM_00107	Chr.2
		600067	AF064200	4q13
	UDP glycosyltransferase 2 family, polypeptide B7/UGT2B7	890009	NM_00107 4	4q13
	biliverdin reductase A/BLVRA	109750	109750 NM_00071	7p14-cen
	biliverdin reductase B/BLVRB	600941	NM_00071	19q13.13- q13.2
	A TPase, Ca++ transporting, cardiac muscle, fast twitch 1/ATP2A1	108730	M23114	16p12
	ATPase, Ca++ transporting, cardiac muscle, slow twitch 2/ATP2A2	108740	NM_00168	12q23- q24.1
 Calcium	ATPase, Ca++ transporting, ubiquitous/ATP2A3	601929	NM_00517 3	17p13.3
	ryanodine receptor 3 (brain and smooth muscle)/RYR3	180903	NM_00103 6	15q14-q15
	calcium channel, voltage-dependent, L type, alpha 1C subunit/CACNA1C	114205	114205 NM_000719	12p13.3
	shaker-related subfamily, member	176266	176266 NM_00223	11q13.4- q14.1

		potassium voltage-gated channel, Isk-related family, member 1/KCNE1	176261	176261 NIM_00021	21q22.1- q22.2
		Isk-	603796	603796 NM_00513	21q22.1
	Potassium		152427	152427 NM_00023	7q35-q36
Cardiac and Vascular		potassium inwardly-rectifying channel, 600734 NM_00089 subfamily J, member 5/KCNJ5	600734	00089 0	11q24
Channels	-	potassium voltage-gated channel precursor, KQT-like subfamily,	192500	192500 NM_00021	11p15.5
		member 1/KCNQ1		o	
		sodium channel, nonvoltage-gated 1			
		alpha/SCNN1A	600228	600228 NM_001038	12p13
•		sodium channel, nonvoltage-gated 1,			
		beta (Liddle syndrome)/SCNN1B	600760	600760 NM_000336 16p13-p12	16p13-p12
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	sodium channel, nonvoltage-gated 1,			
	umnoc	gamma/SCNN1G	600761	600761 NM_001039 16p13-p12	16p13-p12
		sodium channel, voltage-gated, type			
		V, alpha polypeptide (long	600163	600163 NM_00033	3024-021
		(electrocardiographic) QT syndrome 3)/SCN5A		5	
		cystic fibrosis transmembrane			
		conductance regulator/CFTR/ATP-			
	12 14 14 14 14 14 14 14 14 14 14 14 14 14	binding cassette, subfamily C, member			
	CITIONIAE	7/ABCC7	602421	602421 NM_000492	7q31.2
		chloride channel, calcium activated,			
		family member 2/CLCA2	604003	604003 NM_006536	****
		H+-ATPase beta 1 subunit /ATP6B1	267300	267300 AH007312	2cen-q13

	solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4	603345	NM_00375	4921
	solute carrier family 4, sodium bicarbonate cotransporter, member		NM_00378	
	5/SLC4A5	603318	8	4q21
	carbonic anhydrase II/CA2	259730	NM_00006	8q22
	carbonic anhydrase IV/CA4	114760	NM_00071	17023
	carbonic anhydrase XII/CA12	603263	AF051882	15q22
Acidosis	solute carrier family 4, bicarbonate/chloride anion exchanger,		NM_00034	
	member 1/SLC4A1	109270	7	17q21-q22
	solute carrier family 9, member A1/SLC9A1 (sodium/hydrogen ion)	107310	M81768	1p36.1-p35
	solute carrier family 9, member A2/SLC9A2 (sodium/hydrogen ion)	600530	NM_00304 8	2q11.2
	solute carrier family 9, member A3/SLC9A3 (sodium/hydrogen ion)	182307	* * * * * * * * * * * * * * * * * * * *	5p15.3
·	solute carrier family 9 (sodium/hydrogen exchanger), isoform 3 regulatory factor 1/SLC9A3R1		NM_00425	
	solute carrier family 9 (sodium/hydrogen exchanger), isoform 3 regulatory factor 2/SLC9A3R2		NM_00478	
Lithosis	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1- q11.1
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Ion and Water Transport

		chloride channel 5/CLCN5	300008	NM_00008	Xp11.22
Renal Channels		chloride channel Ka, kidney/CLCNKA 602024	602024	NM_00407 0	1p36
		chloride channel Kb, kidney/CLCNKB 602023	602023	NM_00008 5	1p36
		solute carrier family 12 (sodium/potassium/chloride transporters) member 1/SI C12 A1	600839	NM_00033 8	15q15- q21.1
		solute carrier family 12 (sodium/potassium/chloride transporters), member 2/SLC12A2	600840	600840 NM_00104	5923.3
		(sodium/chloride transporters),	896009	NM_00033	16q13
	- 12	ATPase, Na+/K+ transporting, alpha 1 polypeptide/ATP1A1	182310	NM_00070 1	1p13-p11
	Urine Concentratio	Urine ATPase, Na+/K+ transporting, alpha 1 polypeptide-like/ATP1A1L	182360	NM_00167 6	13q12.1- q12.3
		ATPase, Na+/K+ transporting, alpha 2 polypeptide/ATP1A2	182340	NM_00070	1921-923
		ATPase, Na+/K+ transporting, beta 1 polypeptide/ATP1B1	182330	NM_00167_7	1q22-q25
		ATPase, Na+/K+ transporting, beta 2 polypeptide/ATP1B2	182331	X16645	17p
		ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3	601867	NM_00167 9	3q22-q23
		(nephrogenic diabetes	304800	NM_00005 4	Xq28
		aquaporin 1/AQP1	107776	107776 NM_00038	7p14

		aquaporin 2/AQP2	107777	NM_00048 6	12q13
		aquaporin 3/AQP3	600170	600170 NM_00492	9p13
		aquaporin 6/AQP6	601383	NM_00165	12q13
Vesicle	Cytockeletal	adducin 1 (alpha subunit)/ADD1	102680	NM_00111 9	4p16.3
Transport	Elements	adducin 2 (beta subunit)/ADD2	102681	AF001597	2p14-p13
		adducin 3 (gamma subunit)/ADD3	601568	D67031	10q24.2- q24.3
		gap junction protein, alpha 1, 43kD (connexin 43)/GJA1	121014	NM_00016 5	6q21-q23.2
		gap-junction protein alpha 3, 46kD (connexin 46)/GJA3	121015	AF075290	13q11-q12
		gap junction protein, alpha 4, 37kD (connexin 37)/GJA4	121012	NM_00206 0	1p35.1
		gap junction protein, alpha 5, 40kD (connexin 40)/GJA5	121013	121013 NM_00526	1921.1
		gap junction protein, alpha 7, 45kD (connexin 45)/GJA7	* * *	***** NM_00549	***
Gap Junctions	Gap	gap junction protein, alpha 8, 50kD (connexin 45)/GJA8	268009	NM_00526	1421.1
		gap junction protein, beta 1, 32kD (connexin 32, Charcot-Marie-Tooth neuropathy, X-linked)/GJB1	304040	304040 NM_00016	Xq13.1
		gap junction protein, beta 2, 26 kD (connexin 26)/GJB2	121011	M86849	13q11-q12

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			gap junction protein, beta 3, 31 kD (connexin 31)/GJB3	603324	AF052692	1p35.1
			gap junction protein, beta 5, 31.1 kD (connexin 31.1)/GJB5	* * * *	AF052693	* * *
			gap junction protein, beta 6 (connexin 30)/GJB6	* * * *	NM_00678	* * * * * *
			factor l/fibrinogen a, alpha/FGA	134820	134820 NM 000508	4928
			factor L'fibrinogen b, beta/FGB	134830	AH003492	4q28
			factor L'fibrinogen g, gamma/FGG	134850	NM_000509	
			factor II/prothrombin/F2	176930	F2	11p111-q12
			coagulation factor II (thrombin)			
		· <u>.</u>	receptor/F2R	187930	187930 NM_001992	5q13
			coagulation factor II (thrombin)			
	٠		receptor-like 2/F2RL2	601919	601919 NM 004101	5q13
			coagulation factor II (thrombin)			
			receptor-like 3/F2RL3	602779	602779 NM_003950	19p12
	,		tissue factor/factor	134390	134390 NM_001993	1p22-p21
			tissue factor pathway inhibitor			
			(lipoprotein-associated coagulation			
			inhibitor)/TFPI	152310	152310 NM_006287	2q31-q32.1
			tissue factor pathway inhibitor	600033	600033 NM_006528	7q22
			factor V/proaccelerin/labile factor/F5	227400	227400 NM 000130	1q23
	•		factor VII/serum prothrombin			
			conversion accelerator/F7	227500	227500 NM 000131	13934
	•	brin Formati	brin Formati factor VIII/antihemophilic factor/F8	306700	306700 NM_000132	Xq28
			factor IX/Christmas factor/plasma			
<del></del> .:			thromboplastic component/hemophilia		306900 NM_000133Xq27.1-q27.2	Xq27.1-q27.2
			factor X/Stuart factor/F10	227600	227600 NM_000504	13q34
-			factor XI/plasma thromboplastin			
	Clotting		antecedent/F11	264900	264900 NM 000128	4935

			C. A. MILITA			J
			Iactor All/Hageman factor/F12	234000	234000 NM_000505	5 5q33-qter
			factor XIIIa1/fibrin-stabilizing			
			factor/F13A1	134570	134570 NM 000129	6p25-p24
			factor XIIIb/fibrin-stabilizing	134580	****	!-
			prekellikrein/Fletcher factor/kallikrein			
			3, plasma /KLK3	229000	229000 NM 000892	4935
			kininogen/Flaujeac factor/KNG	228960	228960 NM 000893	
			protein S (alpha)/PROS1	176880	NM 000313	3 3 3
Thrombus			protein C (inactivator of coagulation			
Formation			factors Va and VIIIa)/PROC	176860	176860 NM_000312	2913-914
			antithrombin III/AT3		NM_000488	1q23-q25
			gamma-glutamyl carboxylase/GGCX	137167	NM_00082 1	2p12
	:		plasminogen/PLG	173350	173350 NM 000301	6q26
			monocyte antigen CD87/plasminogen			
			activator receptor, urokinase	173391	NM_00265	19013
			type/PLAUR/CD87		ο .	
	-	Thrombolysi	Thrombolysi plasminogen activator,	191840	191840 NM 002658	10q24
		Ø	plasminogen activator-tissue/PLAT	173370	A07197	8p12
	,		plasminogen activator inhibitor, type I			
			(arginine-serpin)/PAI1	173360	X12701	7q21.3-q22
			plasminogen activator inhibitor, type II			
			(arginine-serpin)/PAI2	173390	173390 NM 002575	18q21.3
			integrin, alpha 2b (platelet			
			glycoprotein IIb of IIb/IIIa complex,			
•			antigen CD41B)/ITGA2B	273800	273800 NM_000419	17921.32
	· · · ·		integrin beta chain, beta 3 (platelet	177.470	NM 00021	
			antigen CD61//TGB3	0/46/1	2	
	•					1/q21.32

		glycoprotein Ib (platelet), alpha polypeptide/GP1BA	231200	231200 NM_00017	17pter-p12
Adhesion	Clot	glycoprotein IX (platelet)/GP9	173515	NM_00017 4	3q21
	Adherence	calcium and integrin binding protein/CB	602293	U82226	15q25.3- q26
		thrombospondin 1/THBS1	188060	NM_00324 6	15915
		thrombospondin 2/THBS2	188061	NM_00324	6927
		thrombospondin 3/THBS3	188062	NM_00711 2	1921
		thrombospondin 4/THBS4	600715	NM_00324 8	5q13
		small inducible cytokine subfamily A (Cys-Cys), member 2/monocyte chemotactic protein 1/MCP1/SCYA2	158105	NM_00298	17q11.2- q12
		macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
		interleukin 1 alpha/IL1A	147760	M15329	2q14
		interleukin 1 beta/IL1B	147720	AF043335	2q14
		apoptosis-related cystein protease	147678	NM_00122	11922.2-
		enzyme/ICE/caspase 1/CASP1		m	q22.3
		interleukin 2/IL2	147680	X01586	4q26-q27
		interleukin 3/IL3	147740	NM_00058 8	5q31.1
		interleukin 4/1L4	147780	147780 NM_00058	5q31.1

interleukin 5/IL5	147850	NM_00087 9	5q31.1
interleukin $6/II.6$	147620	AF048692	7p21
interleukin 7/IL7	146660	NM_00088 0	8q12-q13
interleukin 8/IL8	146930	M26383	4q12-q13
interleukin 9/IL9	146931	X17543	5q31.1
interleukin 10/IL10	124092	M57627	1q31-q32
interleukin 11 beta/IL11B	147681	NM_00088 1	19q13.3- q13.4
interleukin 12A (natural killer cell		01000 744	
lymphocyte maturation factor 1, p35/JIL12A	161560	161560 NM_00218	3p12-q13.2
interleukin 12B/IL12B	161561	NM_00044 0	5q31.1-
interleukin 13/IL13	147683	NM_00218 8	5q31
interleukin 15/IL15	600554	U14407	4q31
interleukin 16/IL16	603035	NM_00451 3	***
lymphocyte-associated serine esterase	603149	NM_00219 0	2q31
interleukin 18 (interferon-gamma- inducing factor)/IL18	600953	NM_00156 2	11q22.2- q22.3
interleukin 1 receptor, type VIL1R1	147810	NM_00087	2q12
interleukin 1 receptor, type 2/IL1R2	147811	NM_00463 3	2q12-q22

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interleukin 1 receptor-like 2/IL1RL2 ***** interleukin 1 receptor accessory 602626
protein/IL1RAP B-cell antigen CD25/interleukin 2 receptor, alpha chain/IL2RA/CD25
interleukin 2 receptor, beta/IL2RB 146710
interleukin 2 receptor, gamma chain/IL2RG
interleukin 3 alpha receptor/IL3RA 308385
interleukin 4 receptor precursor/IL4R
interleukin 5 receptor alpha/IL5RA 147851
146661
300007
interleukin 10 receptor, alpha/IL10RA 146933
interleukin 10 receptor beta/IL10RB *****
interleukin receptor 11 alpha/IL11RA 600939
600936
601642

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	interleukin 13 receptor, alpha	300119	NM_00156	Chr.X
	interleukin receptor 13 alpha2/IL13A2	300130	X95302	Xa24
	interleukin 15 receptor, alpha/IL15RA 601070 NM_00218	601070	NM_00218 9	10p15-p14
	interleukin 18 receptor 1/IL18R1	* * * *	NM_00385	***
	CD36/thrombospondin		NM 00007	
	receptor/platelet collagen	173510	- 2	7q11.2
	CD36 antigen (collagen type I			
	receptor, thrombospondin receptor)-		NM_00550	
	like 1/CD36L1/SRB1	601040	5	Chr. 12
	CD5 antigen-like (scavenger receptor			
	cysteine rich family)/CD5L	602592	602592 NM 005894	1q21-q23
	acetyl LDL receptor/scavenger			
	receptor expressed by endothelial	****	NM_003693	***
	macrophage scavenger receptor			
	1/MSR1	153622	153622 NM 002445	8p22
	macrophage scavenger receptor 1-			
	like/MSRL1	602728	****	8p21
	macrophage scavenger receptor type			
Scavenger	III/SRA	153618	153618 NM_002438	10p13
Receptors	mannose receptor, C type 1/MRC1	****	***** NM 006039	****
	endocytic receptor (macrophage			
	mannose receptor family) (KIAA0709) ***** NM_006039	****	NM_006039	****
	toll-like receptor 1/TLR1	601194	601194 NM_003263	4p14
	toll-like receptor 2/TLR2	603028	603028 NM_003264	4q32
	toll-like receptor 3/TLR3	603029	603029 NM 003265	4935
	toll-like receptor 4/TLR4	603030	603030 NM 003266	9q32-q33
	toll-like receptor 5/TLR5	603031	603031 NM 006068	1q41-q42

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'additional genes in Inflammation

	collectin 34	****	AB002631	****
	liver collectin 1/CL-L1	****	***** NM 006438	
	collectin receptor/complement	120577	****	
	surfactant, pulmonary-associated			
	protein D/SFTPD	178635	178635 NM 003019	10q23.3
	surfactant, pulmonary-associated			
	protein A1/SFTPA1	178630	NM_005411 0q22.2-q23	0q22.2-q23
	myeloperoxidase/MPO	254600	102694	17q23.1
	eosinophil peroxidase/EPX	131399	NM_00050 2	***
7	PHOX22/cytochrome b-245, alpha polypeptide/CYBA	233690	NM_00010 1	16q24
Inflammator v Superoxide		306400	NM_00039	Xp21.1
Generation		233700	NM_00026	7q11.23
	PHOX67/neutrophil cytosolic factor 2/NCF2	233710	NM_00043 3	1925
	PHOX40/neutrophil cytosolic factor 4/NCF4	601488	NM_00063	22q13.1
	B-cell antigen CD54/intercellular	147840	NM_00020	19p13.3-
	receptor for advanced glycation end	040/41	7	p13.2
	products/RAGE/AGER	600214	AJ133822	6p21.3
Adhesion	integrin, alpha 7/ITGA7	600536	NM_00220 6	12q13
Toronous	integrin, alpha 8/ITGA8	604063	L36531	****
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	integrin alpha 9/ITGA9	603963	1 L24158	3021.3
 	antigen CD29/integrin, beta-		NM_00221	
<u>-1</u>	CD 27/11 GB1	135630	1	10p11.2
7	vascular cell adhesion molecule 1/VCAM1	192225	NM_00107 8	1p32-p31
ō	complement component 1, R	010710	NM 00173	
ัชไ	subcomponent/C1R	716920	216950 - 3	12p13
Ö	complement component 1, S	120580	NM_00173	12513
<u> </u>	subcomponent/C1S			
<u>ŏ</u>	complement component 1, Q			
S	subcomponent, alpha	120550	****	1p36.3-
Ā	polypeptide/C1QA			p34.1
	Simple in the composition of the		L	126 2
าร	subcomponent, beta	120570	****	1,000.3-
-	1.7010D			p34.1
ຮັ	complement component 1, Q			
าร	subcomponent, gamma	120575	****	1p36.3-
<u>g</u>	polypeptide/C1QG			p34.1
8	complement component 1, Q	0,010,	NM 00121	
ns.	subcomponent binding protein/C1QBP	001209	7	17p13.3
8	complement component 1 inhibitor	106100	90000 MM 00006	11q11-
<u>e</u>	(angioedema, hereditary) /C1NH	100100	2	
3.	complement component 2/C2	217000	217000 NM_00006	-
8	complement component 3/C3	120700	120700 NM_00006	-
			4	p13.2
0	complement component 4B/C4B	120820	NM_00059 2	6p21.3
8	complement component 5/C5	120900	120900 NM_00173	9q34.1
]			`	

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	complement component 6/C6	217050	S NM_00006	5p13
	complement component 7/C7	217070	217070 NM_00058	5p13
	complement component 8, alpha polypeptide/C8A	120950	NM_00056	1p32
	complement component 8, beta polypeptide/C8B	120960	90000 MN 6	1,p32
Classical Pathway	complement component 8, gamma polypeptide/C8G	120930	NM_00060 6	9q34.3
	complement component 9/C9	120940	NM_00173	5p13
	complement factor H/H factor 1/HF1	134370	NM_00018 6	1q32
	I factor (complement)/IF	217030	NM_00020 4	4925
	decay-accelerating factor for complement/DAF/CD55	125240	S72858	1932
	perforin 1/preforming protein/PRF1	170280	NM_00504	10q22
	leukocyte antigen p18- 20/protectin/CD59	107271	M95708	11p13
	T-cell antigen CD46/membrane cofactor protein/MCP/measels virus			
	receptor/CD46	120920	Y07713	1932
	erythrocyte antigen CD55/decay-accelerating factor for		·	
	complement/DAF/CD55	125240	S72858	1932
	leukocyte antigen p.18- 20/protectin/CD59	107271	M95708	11p13
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	-	erythrocyte antigen CD35/complement	ıt		
		receptor CR1 (receptor for	120620	AH002679	1932
		components C3b/C4b)/CD35/CR1		·	1
		complement component 3a receptor 1/C3AR1	* * * * *	NM_00405 4	***
		complement component 4-binding protein, alpha/C4BPA	120830	NM_00071 5	1432
		complement component 4-binding protein, beta/C4BPB	120831	NM_00071 6	1432
		complement component 5 receptor 1 (C5a ligand)/C5AR1	113995	NM_00173 6	Chr.19
		antigen CD21/CD21	***	X98257	****
	·	B-factor, properdin/BF	138470	NM_00171 0	6p21.3
	Alternative Pathway	properdin P factor, complement/PFC	312060	NM_00262 1	Xp11.4- p11.23
		adipsin/complement factor D precursor/DF	134350	NM_00192 8	***
		phospholipase A2 group	172411	172411 NM_000300	1p35
		phospholipase A2 group IB/PLA2G1B   172410 NM 000928 12q23-q24.	172410	NM_000928	12q23-q24.1
		phospholipase A2 group X/PLA2G10	603603	603603 NM_003561 16p13.1-p12	16p13.1-p12
	-	phospholipase A2 group			
		IVA/PLA2G4A	600522	U08374	1925
		phospholipase A2 group VI/PLA2G6	603604	AF064594	22q13.1
		phospholipase A2 group			•
		IVC/PLA2G4C	603602	603602 NM_003706	chr. 19
		phospholipase A2 group V/PLA2G5	601192	601192 NM_000929	1p36-p34
		phospholipase C, beta 2/PLCB2	604114	604114 NM_004573	15q15
-	Phospholipas	Phospholipas phospholipase C, beta 3/PLCB3	600230	U26425	11913

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	es	phospholipase C, beta 4/PLCB4	600810	600810 NM 000933	20p12
Release of		phospholipase C, delta 1/PLCD1	602142	602142 NM 006225	15.
Membrane		phospholipase C, epsilon/PLCE	600597	600597 NM 006226	2q33
Lipids		phospholipase C, gamma 1 (formerly			
(common to	-	subtype 148)/PLCG1	172420	172420 NM 002660 20912-913.	20q12-q13.1
PAF,		phospholipase C, gamma 2		1	
leukotriene,		(phosphatidylinositol-specific)/PLCG2 600220 NM 002661	600220	NM 002661	16a24.1
and		phospholipase D1, phophatidylcholine-			
prostaglandi		specific/PLD1	602382	602382 NM_002662	3926
n pathways)		phospholipase D2/PLD2	602384	602384 NM_002663	-
		lysosomal acid lipase/LIPB	278000	278000 NM_000235	10q24-q25
		lipocortin 1/annexin 1/ANXA1	151690	V00546	9a11-a22
		lipocortin 2/annexin 2/ANXA2	151740	D00017	15q21-q22
•		lipocortin 3/annexin 3/ANXA3	106490	M20560	4q21
	Annexins	lipocortin 5/annexin 5/ANXA4	131230	NM_00115 4	4q26-q28
		lipocortin 7/annexin 7/ANXA1	186360	NM_00403 4	10q21.1- q21.2
		arachidonate 12-lipoxygenase, 12R		NM 00113	17nter
	Arachidonat	Arachidonat type/ALOX12B	603741	6	17pm-
	b	arachidonate 15-	150000	NM 00114	
	Metabolism	lipoxygenase/ALOX15	152392	, 0	17p13.3
		arachidonate 15-lipoxygenase, second type/ALOX15B	603697	NM_00114	**
		prostaglandin endoperoxide synthetase			
		1/COX1/PTGS1	176805	AH001520	9q32-q33.3
		prostaglandin endoperoxide synthetase			
			600262	600262 NM_000963 1925.2-925.3	q25.2-q25.3
		thromboxane A synthase 1/TBXAS1	274180	274180 EG D34613	7q34

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		Biosynthesi	Biosynthesis prostaglandin D2 synthase			
			(hematopoietic)	602598	****	***
			prostaglandin D2 synthase (21kD,			
		••	brain)/PTGDS	176803	M61900	****
		,	prostaglandin 12 synthase/prostacyclin			
			synthase/PTGIS	60109	601699 EG_D83393	20q13
Vasoactiva			prostaglandin E receptor 1, EP1			
Mediators of			subtype/PTGER1	176802	176802 NM 000955	19p13.1
Inflammatio			prostaglandin E receptor 2, EP2	_		1
u	Prostavlandi		subtype/PTGER2	176804	****	5p13.1
1	ns		prostaglandin E receptor 3, EP3			
			subtype/PTGER3	176806	176806 NM 000957	1p31.2
			prostaglandin E receptor 4, EP4			L
		Recentors	subtype/PTGER4	601586	601586 NM 000958	5p13.1
			prostaglandin F receptor/PTGFR	600563	L24470	1p31.1
			prostaglandin F2 receptor negative			
			regulator/PTGFRN	601204	U26664	1p13.1-q21.3
		-	prostaglandin I2			
			receptor/PTGIR/prostacyclin receptor	600022	600022 SEG_HUMII	19q13.3
			thromboxane A2 receptor/TBXA2R	020881	188070 NM 001060	19p13.3
			solute carrier family 21 (prostaglandin			
			transporter), member 2/SLC21A2	601460	601460 NM_005630	3q21
			15-hydroxyprostaglandin			
		Catabolism	dehydrogenase/HPGD	601688	601688 NM_000860	4934-935
			aldo-keto reductase family 1, member			
			C2/AKR1C2	600450	600450 NM_001353	10p15-p14
			arachidonate 5-lipoxygenase/ALOX5	152390	69000 MN	Chr.10
	ı	•		_	<u> </u>	

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		arachidonate 5-lipoxygenase-activating protein/FLAP/ALOX5AP	603700	NM_00162 9	13q12
		leukotriene A4 hydrolase/LTA4H (aminopeptidase)	151570	NM_00089 5	12922
	Synthesis	leukotriene C4 synthase/LTC4S	246530	7 7 7	5q35
Leukotrienes		Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
		Canna-gratanyinanspepudase	137181	AH002728	22q11.1
		Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412 1	**
	Recentors	cysteinyl leukotriene receptor 1/CYSLT1	300201	NM_00663 9	Xq13-q21
	STORMAN	leukotriene b4 receptor (chemokine receptor-like 1)/LTB4R	601531	NM_00075	14q11.2- q12
	Catabolism	Catabolism renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
	Biosynthesis	CDP-choline:alkylacetylglycerol cholinephosphotransferase	**	***	***
	Receptors	platelet activating factor receptor/PTAFR	173393	M88177	1p35-p34.3
Platelet		platelet activating factor acetylhydrolase 1/PAFAH1	601690	NM_00508 4	6p21.2-p12
Activating Factor (PAF)		praiced activating factor acetylhydrolase, isoform 1B, alpha	601545	NM_00043 0	17p13.3
,	Catabolism	praises activating factor acetylhydrolase, isoform 1B, beta makerit a A EA HI Da	602508	NM_00257 2	11923
·		acetylhydrolase, isoform 1B, gamma	603074	NM_00257 3	19q13.1

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			nlatelet activating factor		21,000	
			acetylhydrolase 2/PAFAH2	602344	NIM_00043	***
			superoxide dismutase 1/SOD1	147450	147450 NM 000454	21q22.1
			superoxide disinutase 2, mitochondrial, 147460	147460	X65965	6q25.3
			glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	230450 NM_00149_8	6p12
			glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
			catalase/CAT	115500	115500 NM 001752	11p13
	Antioxidants	Antioxidants	Antioxidants Antioxidants glutathione peroxidase 1/GPX1	138320	AF029317	3p21.3
	and Free Radical	and Free Radical	glutathione peroxidase 2 (gastrointestinal)/GPX2	138319	NM_00208 3	14q24.1:
•	Scavengers	Scavengers	glutathione peroxidase 3		NM_00208	
Amelioration			(plasma)/GPX3	138321	4	5q32-q33.1
of Oxidative	-		glutathione peroxidase 4		NM 00208	
Stress			(phospholipid hydroperoxidase)/GPX4   138322	138322	5	19p13.3
			glutathione peroxidase 5 (epididymal		NM_00150	
			androgen-related protein)/GPX5	603435	6	***
			ATX1 (antioxidant protein 1, yeast)	077709	NM_00404	5227 223
<u>. !1</u>			apolipoprotein (a), Lp(a)/LPA	152200	152200 NM 005577	5452-455 6927
		·	paraoxonase 1/PON1 (arylesterase)	168820	NM_00044 6	7q21.3
	Prevention of Lipid	Prevention of Lipid	paraoxonase 2/PON2	602447	NM_00030 5	7q21.3
	Oxidation	Oxidation	paraoxonase 3/PON3	602720	L48516	7921.4
			apolipoprotein, Lp(a)/LPA	152200	NM_00557 7	6927

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		Ta	ble 7. Neur	rological ar	id Psychiatr	Table 7. Neurological and Psychiatric Disease Indications	dications		
	Pathway	Amyotrophi c Lateral Sclerosis	Multiple Sclerosis	Dementia	Parkinson' s Disease	Parkinson' Huntington's Disease	Epileps y	Spasticit y	
	storage								
	release								
	glutamate			F. 1255	3000		Sept.		
	serotonin		-		THE STATE OF	<b>新新</b>		1	
	dopamine					の一般の一般	14.00		
	epinephrine and			1.00	100000				
Neuro-	norepinephrine								
transmitters	acetylcholine			200 M		· · · · · · · · · · · · · · · · · · ·			
	histamine				and Francisco	TO ANGLE WAS A STREET	1.00 miles	THE PERSON NAMED IN COLUMN NAM	
	adenosine				5.00		語の記録		
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•	cholecystokinin						No.		
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	calcium channel			10 M				NAME OF THE PERSON OF THE PERS	
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	prostaglandin			10 M	の場合の				
Inflammation	Inflammation platelet activating factor		<b>新新教</b>	3					
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	0			operator Manage														Table 7.	Anxiety				Ì	
	S	estrogen	testosterone and DHT	corticosteroid	hemostasis	oxygen stress	intochonaria	protein maturation and degradation	second messenger cascade	growth, differentiation,	cytoskeleton	secretion	adhesion	amyloid processing	lipid transport and	myelination	folate metabolism		Pathway		storage	release		
·	NAGENICS	Steroid									i.	n, and Maintainance	Mannanice					•						

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glutamate	serotonin	dopamine	epinephrine and	norepinephrine	acetylcholine	histamine	adenosine	GABA	glycine	taurine	melatonin	nitric oxide	peptide hormone	processing	opioids	oxytocin	cholecystokinin	neuropeptide Y	leptin	neurotensin	tachykinin	bradykinin	angiotensin	vasopressin	vasoactive intestinal	peptide	calcitonin and CGRP	corticotropin releasing
		_		Neuro-	transmitters																	-						Den. ( )

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	thyroid stimulating							
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	hormone			-				
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	growth hormone						4.0	
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Channels	potassium channel		in charles			10.00	September 1	
	sodium channel					1000000000000000000000000000000000000		
	prostaglandin				<b>有种种</b>	<b>************************************</b>		
Inflammation	Inflammation platelet activating factor				200	Supplied to	Seaster Service	
	cytokines					の経験が	<b>新疆</b>	
Steroid	estrogen					は別の対象		
Hormones	testosterone and DHT					A CANADA CONTRACTOR AND ADDRESS OF THE ADDRESS OF T		
	corticosteroid							
Cardiovascul	Cardiovascul clot formation					<b>这种的一种,</b>		
ar	hemostasis	が と を で を で で で で で で で で で で で で で で で で			<b>多一大大</b>			
	oxygen stress					ないと		
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protein maturation and	uegradanon	second messenger	cascade	growth, differentiation,	and apoptosis	cytoskeleton	secretion	adhesion	amyloid processing	lipid transport and	metabolism	myelination	folate metabolism	
			Cellinlar	Growth	Differentiation	n and	Maintainance							

				Table 8. To	Table 8. Toxicological Indication	Indication	
					Satety		
	Pathway	Efficacy	Dyscrasia	Cutaneou Systemic S Toxicity	Cutaneou Systemic	CNS	Hepatic
ion	Gastrointestinal Drug Metabolism				ć	(Major)	TOWICH
Distribution	Drug Binding						
Tollino III	Drug Transport	Mark States	Total State	100		S. S	古意思
Phace I Day	Monooxigenases (mixed		1.12	公婆在	(p) (7) (2) (A)		
Metabolism	function oxidases)						
Coridation	General Oxidases	<b>新教育</b>			の必然の		
Pub	Dehydrogenases						(1)
reduction	Fatty Acid b-Oxidation			100			
	Reduction						

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hase II Drug Metabolism	Catabolism	Uptake and	Renal Tubular Uptake and Concentration	Protection from Radical Damage	Mast Cell and T-Cell Response	B-Cell Response	Myeloid Differentiation
Conju	Catab	Upts	Renand	Pro	Ma	B-0	Ź

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Indicatio		Renal	TOXICIL			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		X2.		100 m
kicological	Safety	Pulmonar	y toxicity toxicity	-		の大学			Co. 18 Co.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Table 8. Toxicological Indication		carurovasc								
		Pathway	Gestrointectine 1 Dans	Metabolism	Drug Binding	Drug Transport	Monooxigenases (mixed	Metabolism function oxidases)	General Oxidases	Dehydrogenases
				ion	Dietribution	10111011101	ound I page	Metabolism	Coridation	Jun's

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reduction	Fatty Acid b-Oxidation			
, cancillary	Reduction		100000	
Phase II Drug Metabolism	Conjugation			
(conjugation and catabolism)	Catabolism		n S Mark	
ŗ	Detake and			and the second
Excretion	Renal Tubular Uptake and Concentration			
Organ and Tissue Damage	Protection from Radical Damage			
Immune	Mast Cell and T-Cell Response			
Response	B-Cell Response			
	Myeloid Differentiation	-		

Table 9. Inflammatory Indication	Asthma ve Pulmonar Pulmonar Pulmonar y Disease	
	Pathway Arthritis	Discriminatio  Antigen Presentation and  Recognition  Self vs Non-

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Intervenous, interventurs, TNF Ligand Superfamily, Chemokine Superfamily, and other	Cyclophilins	Testosterone/DHT	Vitamin D	Retinoic Acid	Myeloid Progenitor Cell	Activation,	Differentiation, and	Proliferation	(excluding genes from	Apoptosis	(additional genes in	Adhesion and Migration	Glycosyltransferases	Proteases and Protease	Inhibitors	i ilagocyiusis ui	Immunoglobulin Heavy	and Light Chains and	Genes Involved in	Rearrangement, Isotype	Switching, and	Transcription
Cytokine- Mediated Immune Regulation	Non- Cytokine	Mediated	Immune	Regulation					;	Cell-	Inflammation										ק	Peptides

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ý	Complement Acute Protection from Pathogens	Degrammenton or Platelets, Mast Cells, Neutrophils, and Essissebile	Release of Membrane Lipids			Platelet Activating Factor (PAF)	Lipoxins	Leukotrienes Histamine	Serotonin	Nitric Oxide Pathway	Endothelial Growth	Epinephrine and Norepinephrine Pathway	Dopamine Pathway	Adenosine Pathway	Acetylcholine Pathway	Jon Channels Opioids
VARIAGENIC				Small Molecule	Inflammation						Vascularizati on					Neurotransmi
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ndication	Athero-sclerosis			
ammatory I	Psoriasis			Actq01_xls
Table 9. Inflammatory Indication	Nephritis Psoriasis			
	Pathway	Antigen Presentation and Recognition	TNF Ligand Superfamily, Chemokine Superfamily, and other	Cyclophilins
•		Discrimination n (Self vs Non-	3 a a 5	Non-

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Tachykinin, Substance P, or Neurokinin Pathway Bradykinin

Inflammetory Modulation

Parathyroid Hormone (PTH)

Adrenocorticotropic

Hormone

Melanocortin and

Cholecystokinin (CCK)

ucı anu Peptide Hormone

Folate Metabolism Nucleotide Metabolism

(additional genes in

Toxicology)

Oxygen Stress Cytoskeleton

General Cell Growth

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Corticosteroids	Testosterone/DHT	Vitamin D	Retinoic Acid	1-cen, b-cen, and	Myeloid Progenitor Cell	Activation,	Differentiation, and	Proliferation	(excluding genes from		(additional genes in	Oncology)	Adhesion and Migration	Glycosyltransferases	Proteases and Protease	Inhibitors	r Hagocytosis of	Immunoglobulin Heavy	and Light Chains and	Genes Involved in	Rearrangement, Isotype	Switching, and	Transcription	Complement	Acute Protection from	Pathogens
Cytokine	Mediated	Immune	Regulation						:	Vedict-	Medialed	mitammanon 								-	Defense	Proteins and	Peptides			

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Platelets, Mast Cells, Neutrophils, and	Release of Membrane	(common to PAF.	leukotriene, and		Prostaglandins	_	Factor (PAF)	Lipoxins	Leukotrienes	Histamine	Serotonin	Nitric Oxide Pathway	Endothelial Growth	Epinephrine and	Norepinephrine Pathway	Dopamine Pathway	Adenosine Pathway	Acetylcholine Pathway	Ion Channels	Opioids	Leptin	Cholecystokinin (CCK)
			Small	Molecule Mediators of	Inflammation								Vascularizati on						Neutrotransmi	tter and	Pentide	Homone

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Variagenic	SS	<b>O</b>	001/20/2000	2			ב כ	CONFIDENTIA
Inflammetory Modulation	Tachykinin, Substance P, or Neurokinin Pathway							
	Bradykinin							
	Parathyroid Hormone							
	(PTH)							
	Melanocortin and			 				
	Adrenocorticotropic							
	Folate Metabolism	The second second	- A - A - A - A - A - A - A - A - A - A					
	Nucleotide Metabolism							
General Cell								
Growth	Oxygen Stress							
	(additional genes in							
	Toxicology)							
			Table 10.	Metabolic	or Endocrin	Table 10. Metabolic or Endocrinologic Indication	ation	
	Pathway	Diabetes Mellitus	Diabetes Insipidus	Obesity	Contra- ception	Hormonal Insufficienc	Osteo-	Acne
						to Aging		
General Metabolism	Peptide Hormone				A NEW			
for Peptide Hormones	Processing							
Dentido	Circadian Regulation		Transfer of the second		1000	<b>新加州</b> 李明		
Hormone	Adrenocorticotropic Hormone							
Control of	Thyroid Hormone	erd land Edward Comment						
Total Company	Gonadotropic Hormones			100 m	<b>提到小海堡</b>	<b>新作、光彩点</b>		ALIAN SER

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SS	Progestins	Estrogens	Androgens	Glucocorticoids	Mineralocorticoids	Mediators of Steroid	Response	Serotonin	Dopamine	Norepinephrine	Neuropeptide Y	Galanin	Melanocortin	Opioids	Cholecystokinin	Adrenocorticotropic	Hormone	PACAP	Enterostatin	Insulin	Leptin	Thyroid Hormone	Glucagon	Glucagon-Like Peptide	Insulin	Uncoupling Proteins	Somatostatin	Growth Hormone
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Insulin-Like Growth	Factor	Fibroblast Growth Factor	Sonic Hedgehog	Nerve Growth Factor	Neurotrophins	Hormone Signalling	Carbohydrate Metabolism	Maturation and		Protein Glycosylation	Neovascularization	Hemostasis	Amelioration of	Oxidative Stress	Retinoids	Differentiatio Peroxisome Proliferation	1	Lipid Metabolism and	Storage	Calcium Metabolism	Bone Growth Factors and Receptors	Vitamin D	Phosnhate Metabolism			Adhesion
	General	Growth	Control	1			Carbohydrate !	Metabolism		irypergryceni ic Strees			Ε	_	Adipocyte	Differentiatio	Lipid	Metabolism 1	and Storage	) leinim	.0		_	Homeostasis	Inflammation Cytokines	(more genes Adhesion

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Table 10. Metabolic or Endocrinologic

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	Pathway	Alopecia	Adrenal Dys- function	Thyroid Dys- function	Parathyroi d Dysfunctio n	-
General Metabolism for Peptide Hormones	Peptide Hormone Processing				·	
	Circadian Regulation Adrenocorticotropic Hormone					
Control of Metabolism	Thyroid Hormone Gonadotropic Hormones			AL VIEW	趣念题	
	Progestins Estrogens					
Steroid	Androgens					
Hormones	Glucocorticoids Mineralocorticoids					
	Mediators of Steroid Response					
Neural	Serotonin					
ulation of	Regulation of Dopamine					
Appetite	Norepinephrine					
	Neuropeptide Y					
	Galanin					
	Melanocortin					
	Opioids					
Peptide	Cholecystokinin					

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